the journal

OF THE AMERICAN DENTAL ASSOCIATION

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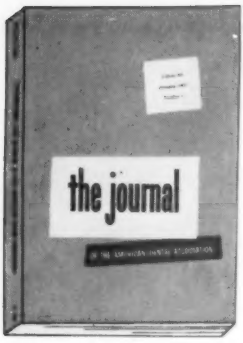

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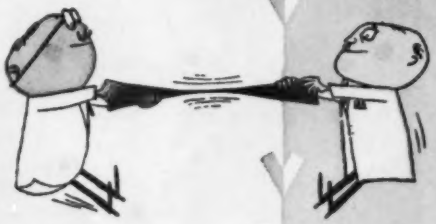

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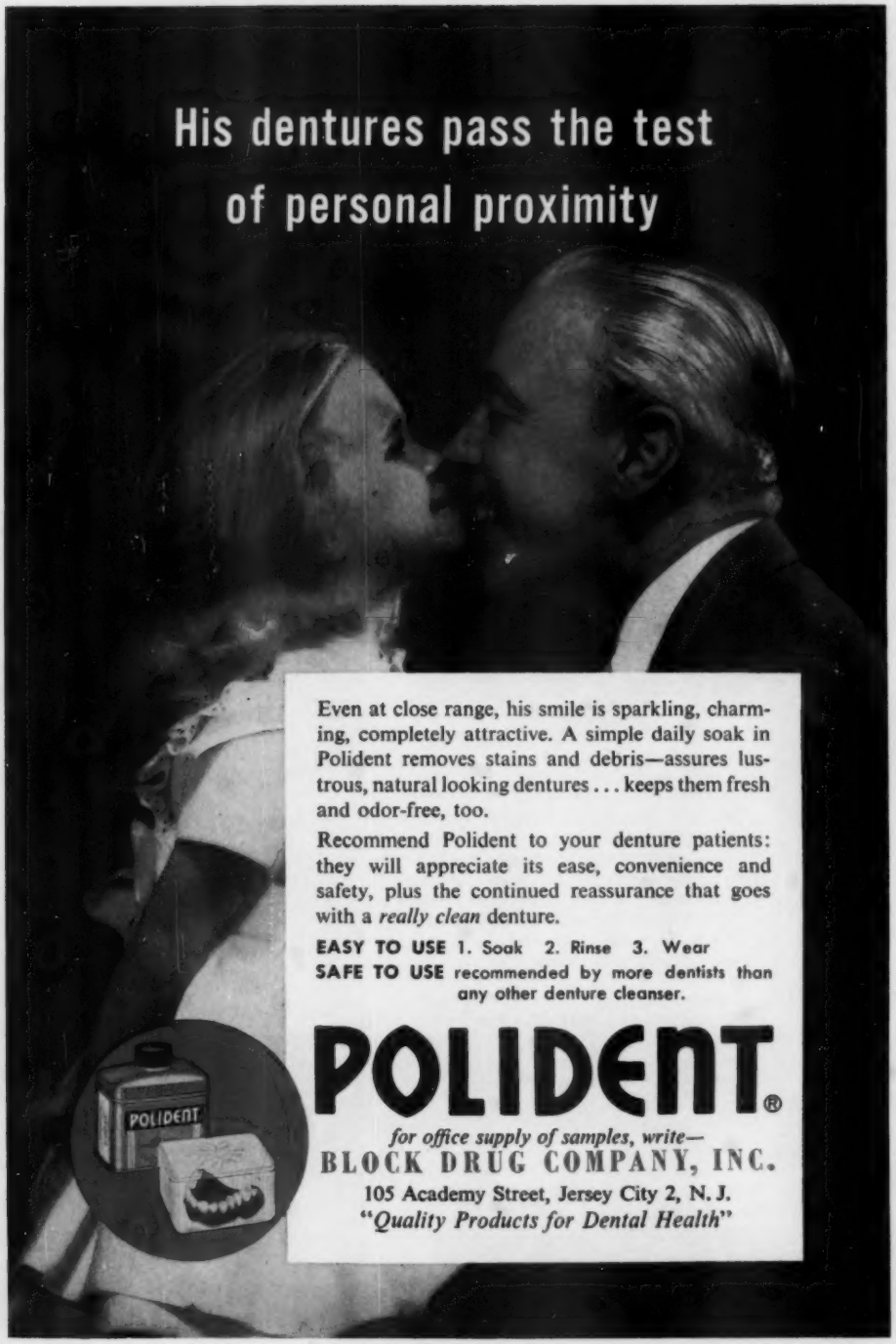

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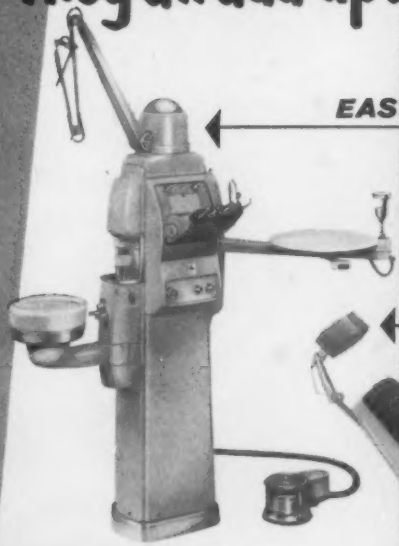

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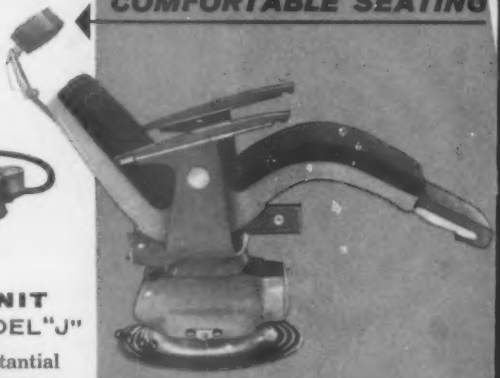

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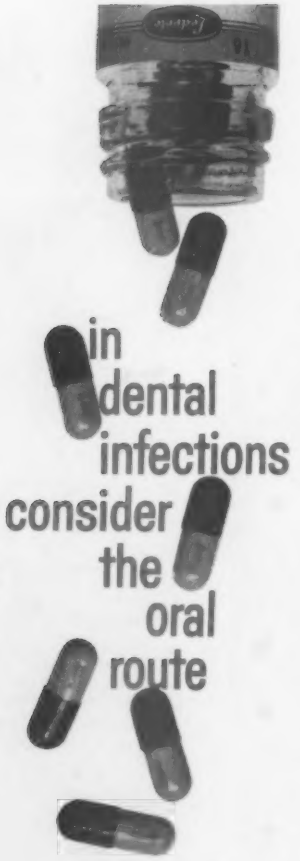

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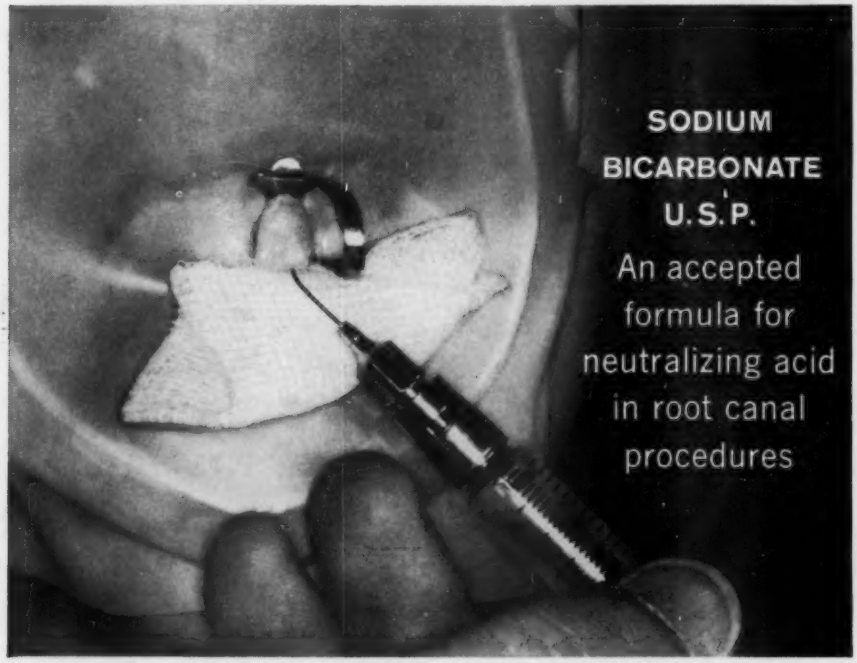

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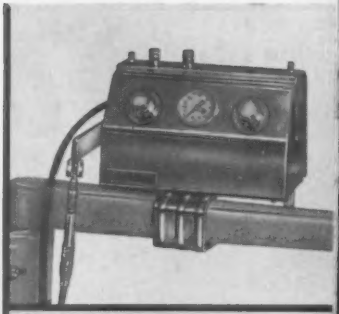

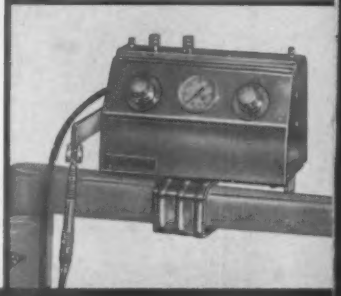

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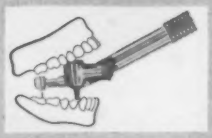

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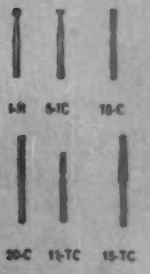

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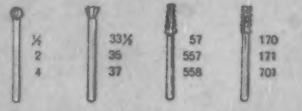

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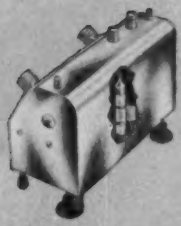

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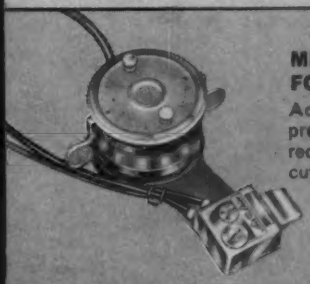

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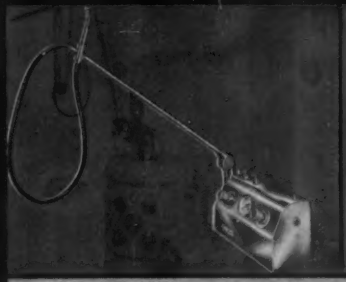

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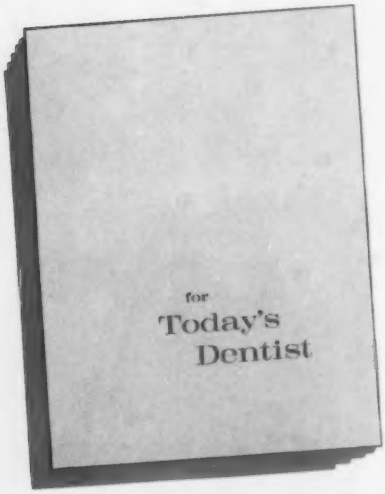

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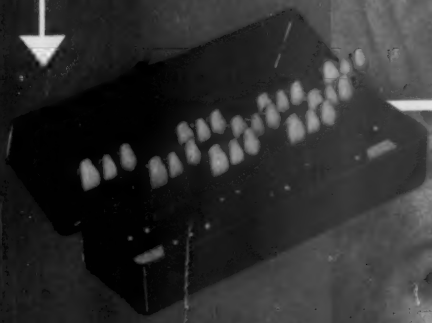

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In vitro studies on the marginal leakage of restorative materials

Marjorie L. Swartz, M.S., and Ralph W. Phillips,† M.S.,*
Indianapolis

A study was made to evaluate in vitro the adaptation of restorative materials using a radioisotope technic. Six different restorative materials were placed in extracted teeth. The relative sealing abilities were determined on the basis of the marginal permeability to Ca^{45}. The margins of the 24 hour old amalgam restorations were readily penetrated, but leakage diminished with aging of the restoration. Some leakage was observed with all silicate and zinc phosphate cement restorations. The use of the recommended cavity liner improved the adaptation of the resin restorations. These data compare favorably with those obtained in comparable tests made with in vivo restorations.

There has always been keen interest in the adaptation of dental restorative materials to the walls of the cavity and the relative ability of a material to seal the cavity against ingress of oral fluids and microorganisms. Various test methods have been used to study the problem. These methods have included adaptation of materials to glass, metals and extracted teeth by measurement of the resistance to tensile stress and to air pressure, the percolation by moisture at the marginal areas during temperature change and by marginal penetration of various dyes, bacteria and radioactive isotopes.[1-21] The results of these studies, due in part to the different investigative procedures employed, often have been divergent and even conflicting. Furthermore, the major portion of the published research has been

conducted on in vitro restorations with no comparable clinical studies for correlation. Thus the validity of the laboratory tests has never been confirmed and it is possible that in vivo restorations, subjected to the normal oral environment, might exhibit leakage patterns entirely different from those placed and stored in vitro.

In a recent investigation from this laboratory Ca^{45} was used as the means of assay[22] to study the relative adaptation at varying time intervals of restorations placed in vivo in dogs and in humans. A comparable in vitro study would be valuable in correlating the leakage patterns in restorations placed in extracted teeth with similar restorations placed in living teeth in the normal oral environment. Thus this investigation was designed to evaluate in vitro the adaptation of the same restorative materials by the same radioisotope technic as was utilized in the previous in vivo tests. In addition, certain manipulative variables, such as the effect of cavity liners, were studied.

PROCEDURE

The restorations were placed in sound, extracted teeth. The teeth were stored in tap water after extraction and were not permitted to dehydrate. Cuspids and bicuspids were utilized as a rule since it was difficult to seal multirooted teeth sufficiently to prevent the penetration of the test solution up through the root canal and into the dentin. Usually Class I restorations were placed in the bicuspids and Class V restorations in the incisal third of the crowns of the cuspids.

The adaptation of six restorative materials was studied: amalgam, silicate cement, zinc phosphate cement and three types of restorative resins. The manipulation of all materials was standardized in compliance with accepted clinical procedures. The cavity preparations were dried with compressed air before insertion of the restorative material; however, care was taken not to dehydrate the teeth excessively. The restored teeth were placed in fresh tap water weekly. In order to determine the effect of operator proficiency with a given material, at least two operators placed restorations with each material.

With the amalgam restorations, an 8:5 mercury-alloy ratio was employed in conjunction with the conventional "increasing dryness" technic of condensation. An additional series of restorations were made using a lower mercury-alloy ratio.[23] In these specimens equal parts of mercury and alloy were employed and no mercury was expressed prior to condensation. All of the restorations were carved but none were polished. Since cavity liners are routinely employed in many dental offices, the adaptation of amalgam placed in cavity preparations previously coated with varnishes was studied. Two commercial varnishes, one (Copalite) prepared from natural gums and resins and a second (Cavaseal) compounded from a synthetic resin, were used.

The powder-liquid ratio of the zinc phosphate and silicate cements was standardized. The surfaces of the silicate restorations were protected with cocoa butter after removal of the matrix and before being stored. Twenty-four hours later the restorations were finished by means of a sandpaper disk lubricated with cocoa butter. Pressure was also used to insert the zinc phosphate restorations and again the excess cement was not removed until 24 hours after insertion.

Two types of commercial restorative resins, as well as an experimental one, were included in the study. Sevriton was selected as being representative of the sulfinic acid activated resins and Kadon as one whose polymerization is based on a tertiary amine system. A laminating, or flow technic[24] was utilized with Sevriton and the bead-brush or Nealon[25] technic with Kadon. Both materials were used with and without the manufacturers' recommended cavity liners. The catalyz-

ing system of the experimental resin (from L. D. Caulk Co.) was not known. It was placed by means of the bead-brush technic in cavities which were treated first by the Caulk Cavity Primer. No resin restorations were finished until 24 hours after insertion.

The marginal adaptation of the restorative materials was tested at 24 hours, one month and six months.

Armstrong,[13] Sausen[14] and Crawford[15] have employed Ca^{45} as a tracer element to indicate the marginal adaptation of dental restorations. This same method was employed here. Basically the technic used was that of Crawford[15] although the method of sealing the roots and the length of time that the specimens were subjected to the isotope were modified. The concentration of the radioactive solution of calcium chloride was 0.1 millicurie per milliliter and the pH was adjusted to 5.5 by the addition of dilute sodium hydroxide.

The technic, described in considerable detail in a previous publication concerned with the adaptation of restorations placed in vivo,[22] consisted of sealing the roots, root canals and any discrepancies in the enamel surfaces with a combination of tin foil and nail lacquer. Only the margins of the restoration were exposed to the isotope. Infiltration of the isotope from any other area will, of course, obliterate the true pattern of marginal leakage. The sealed teeth were immersed in the isotope solution for two hours, rinsed in running water for one hour and then scrubbed with a detergent and water. After the foil was removed, the roots were again thoroughly scrubbed. A wet, 400 mesh carborundum wheel was used for preparing longitudinal sections through the restorations. The pulp was removed from the teeth and the cut surfaces carefully brushed and dried before they were placed on x-ray film for preparation of the radioautographs. Films were developed after 17 hours' exposure and the radioautographs examined for infiltration from sources other than the marginal areas. If there was evidence of such leakage, the specimen was discarded.

A slight modification of this technic was employed in one group of tests. In a previous study[26] concerned with the adaptation of veneering materials to cast gold crowns it was found that the relative adaptation of different combinations of materials could also be evaluated on the basis of the length of time which the specimen was immersed in the radioisotope. Some specimens showed leakage in a matter of hours whereas others exhibited no penetration of the isotope even after a three week immersion. Thus in one series of tests the restored teeth were placed in the radioisotope and the amount of infiltration which occurred after one, two, four, six and 24 hours exposure to the isotope was compared.

RESULTS

A minimum of 12, and often as many as 30, restorations have been studied at each time interval with each material and the radioautographs shown are representative of the average results obtained with the entire group.

Adaptation After Two Hour Immersion In Isotope: Amalgam; Silicate and Zinc Phosphate Cement; Restorative Resin • There was considerable variation in the adaptation of individual amalgam restorations as illustrated by the eight radioautographs of 24 hour old amalgam specimens (Fig. 1). The darkened areas represent the isotope infiltration. A radioautograph, selected as representative of results obtained with the 28 amalgam restorations tested at this time interval, is shown in Figure 2. A typical radioautograph of the leakage after one month also is shown. A representative six month amalgam specimen appears in Figure 3. It will be noted that the marginal leakage of amalgam restorations decreased with time. Examination of all individual resto-

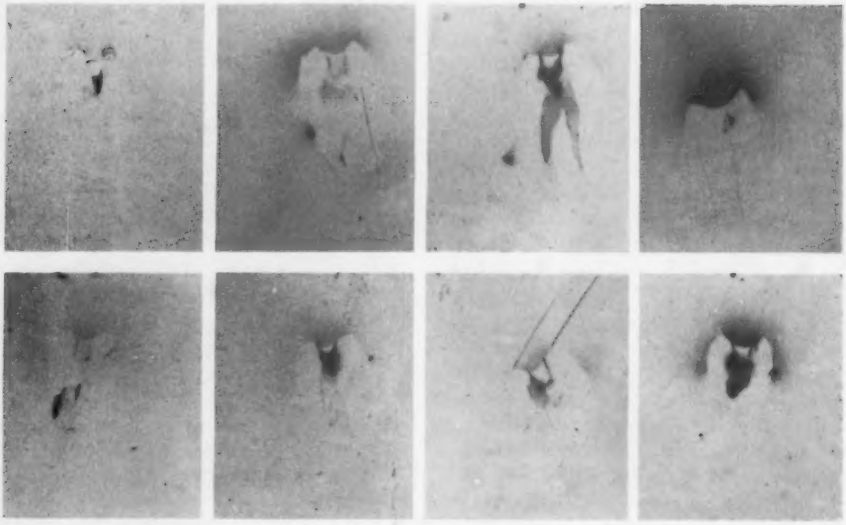

Fig. 1 • Radioautographs of amalgam restorations illustrating the range of results obtained with restorations 24 hours old

rations indicated this most definite trend. Improvement in adaptation as the amalgam restoration ages was also noted in the restorations placed in vivo.[22] The phenomenon had been suggested by Nelsen and co-workers[9] who found that marginal percolation resulting from temperature change was less in the older amalgam restoration.

Reducing the amount of mercury in the original mix did not alter the leakage pattern. In Figure 4 it can be seen that the isotope infiltration around the restorations prepared using the low mercury technic was comparable to that occurring with 24 hour specimens prepared by conventional mercury-alloy ratios. Since the radioautographs at each time interval were comparable to those secured in the preceding series, the one and six month data are not shown. Even at this ratio, a smooth plastic mix was possible. These tests indicate that similar adaptation of amalgam restorations can be secured through the utilization of any sound manipulative and condensing procedure.

Examination of 24 hour and 6 month radioautographs (Fig. 5) revealed that the initial sealing properties of amalgam are greatly improved by use of a commercial cavity varnish (Copalite). Variation in individual specimens was minimal as only two of 20 specimens revealed even slight marginal penetration of the isotope. No change in marginal permeability could be detected in restorations tested after six months. A similar improvement in adaptation of amalgam was obtained in a second series of tests utilizing the other lining agent (Cavaseal). These data are in agreement with those previously reported on in vivo restorations placed in dogs.[22]

Penetration of the isotope, in varying degrees, was observed around all silicate restorations. The radioautographs which appear in Figure 6 indicate the average marginal permeability of restorations tested 24 hours and one month after insertion. Six month specimens demon-

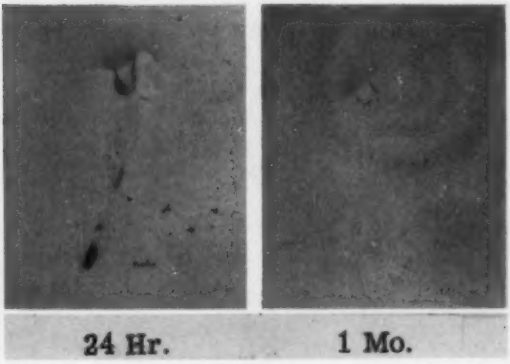

Fig. 2 • Amalgam restorations selected as typical of results obtained with restorations tested 24 hours and one month after insertion

strated relatively the same magnitude of leakage. The leakage pattern was not as consistent within each experimental group as with the other restorative materials, although the greatest variation was detected in the 24 hour restorations. The radioautographs also show considerable absorption of the isotope by the material itself, varying from merely surface absorption to complete permeation of the restoration.

A similar variation in individual specimens was observed with zinc phosphate cement. The representative 24 hour and one month results appear in Figure 7. The six month specimens again revealed no greater tendency to marginal permeability over this period.

In general there appeared to be slightly greater isotope penetration at the margins of the zinc phosphate restorations than with the silicates. However, the absorption of the isotope into the silicate itself was usually greater than into zinc phosphate cement. This penetration of silicate by the isotope might be indicative of the ease with which some other materials may permeate the surface to produce staining of the clinical restoration. Again, these findings on cement correlate

Fig. 3 • Representative amalgam restoration tested six months after insertion

Fig. 4 • Restoration condensed using low mercury technic; tested 24 hours after insertion

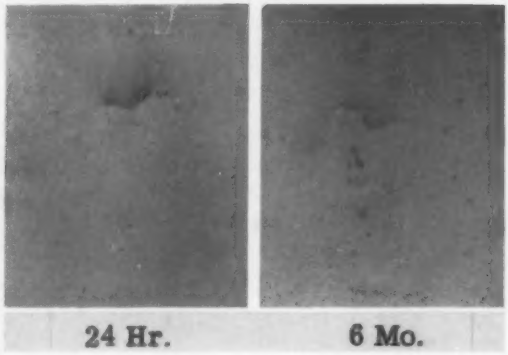

Fig. 5 • Amalgam restorations placed with a cavity liner and tested 24 hours and six months after insertion

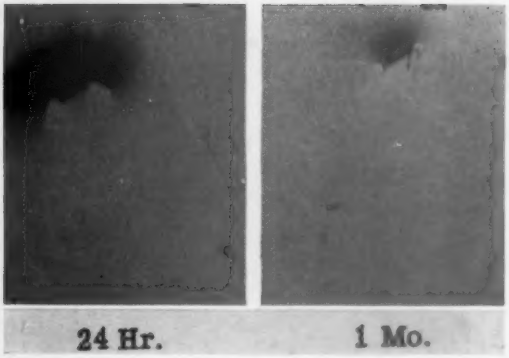

Fig. 6 • Silicate restorations tested 24 hours and 1 month after insertion

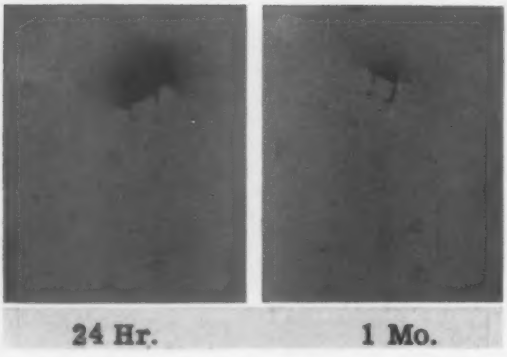

Fig. 7 • Zinc phosphate cement restorations tested 24 hours and 1 month after insertion

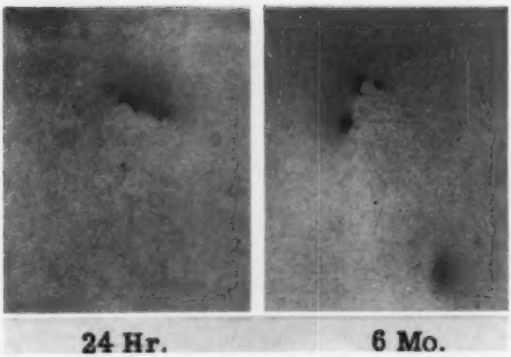

Fig. 8 • Sevriton restorations placed with the recommended cavity liner tested 24 hours and six months after insertion

well with the previous in vivo tests.[22]

The amount of isotope which penetrated the margins of Sevriton restorations was relatively slight when the manufacturer's cavity liner was employed. This was true of restorations tested at all three time intervals. The magnitude of penetration after one day and after six months can be seen in Figure 8. Results were consistent. When the cavity liner was omitted, the variation in individual specimens became greater and the leakage increased. This increased marginal permeability is illustrated in Figure 9.

The data collected for the second resin material, Kadon, revealed a high degree of deviation, particularly from one operator to another. With most operators, leakage appeared to be greater with this type of resin than with the sulfinic acid type (Fig. 10); however, the fact that some operators were able to obtain relatively well adapted restorations would suggest that this material is more sensitive to manipulative variables.

A radioautograph which illustrates the sealing ability of the experimental resin is shown in Figure 11. The infiltration at the margins was slight at this 24 hour time interval.

Fig. 9 • Sevriton restoration which was placed with the cavity liner omitted, tested 24 hours after insertion

Fig. 10 • Kadon restoration placed with recommended cavity primer, tested 24 hours after insertion

The effect of thermal change was studied on a limited number of resin restorations, six in each group. Since the results with Sevriton had been fairly constant, this resin was used as the restorative material. The specimens were placed alternately in warm and cold solutions of the isotope. The tooth was first stored in the cold solution for five minutes, taken out and placed in the warmer solution for five minutes. A total of 29 changes were made.

The effects of three temperature differentials (40°C., 20°C. and 10°C.) were studied. Representative results appear in Figure 12. Certainly, leakage did increase when the restoration was subjected to temperature fluctuations. The degree of leakage seemed to be dependent on the magnitude of the change. With a temperature differential of 40°C. the infiltration was more severe than when the differential was only 10°C.

Leakage on the Basis of Time in the Isotope • Examination of radioautographs from all the restorations that had been subjected to the isotope for intervals of one, two, four, six and 24 hours revealed it was not possible to determine the exact time when leakage first occurred. There was evidence of infiltration around 24 hour old amalgam and silicate restorations after only a one hour exposure in the isotope (Fig. 13). Although in many instances it was difficult to evaluate radioautographs of specimens subjected to the isotope for 24 hours, careful examination of the radioautographs of teeth restored with Sevriton revealed only a slight marginal penetration even after this prolonged immersion (Fig. 14).

Altering the immersion period made little difference in the basic behavior of the material. In other words, the margins of the restorations showing the greatest

Fig. 11 • Experimental resin placed with the cavity primer and tested 24 hours after insertion

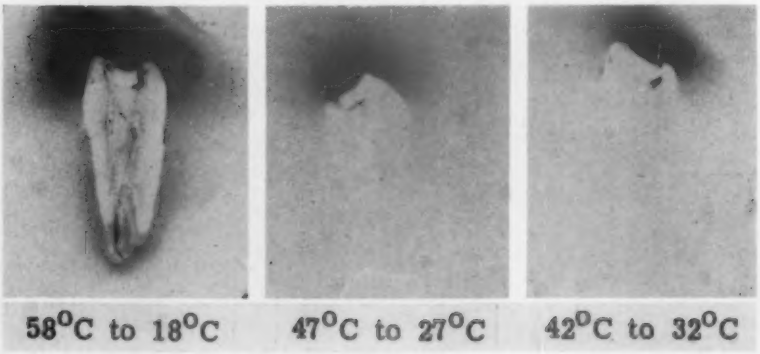

Fig. 12 • Radioautographs of resin restorations illustrating magnitude of leakage induced by varying degrees of temperature change

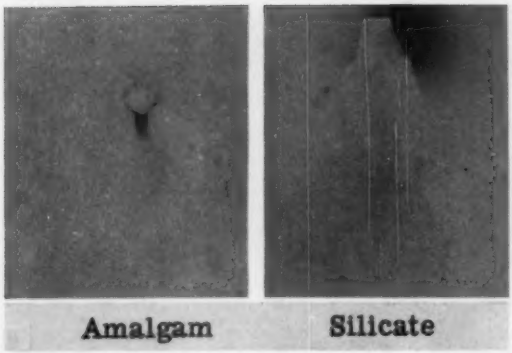

Fig. 13 • One month old amalgam and silicate restorations immersed in $Ca^{45}Cl_2$ for one hour

leakage after one hour immersion also exhibited the greatest penetration after 24 hours immersion in the isotope.

DISCUSSION

Although these data must be considered as somewhat preliminary in nature and there are many factors and influences yet to be investigated, it is felt that certain trends and characteristics of different materials have been revealed. The close correlation with the results obtained in the previous in vivo study is most encouraging and strongly suggests the feasibility of expanding these in vitro studies to obtain further information regarding other materials and the effects of various manipulative technics on the marginal integrity of dental restorations. The fact that the radioisotope test method may have considerable application in assessing various operative technics is further indicated by the variation in results obtained with a given material when used by different operators (Fig. 15). These data also emphasize that an evaluation of a material can only be made by use of a large number of specimens, placed by more than one operator.

Cavities were prepared with both high and conventional speed rotary instruments. No attempt was made to correlate results with instrumentation and it is of course possible that some of the observed variations in individual experimental groups may have resulted from differences in the texture of the cut surfaces. Furthermore all assessment of the materials was based on the permeability of the margins to the calcium ion. The use of additional labeled compounds in future work should provide a more comprehensive evaluation.[20]

The authors are cognizant of the heroic nature of the test and it is true that the actual clinical implications of marginal permeability of these magnitudes are not known at this time. The significance can

Fig. 14 • One month old Sevriton restoration immersed in $Ca^{45}Cl_2$ for 24 hours

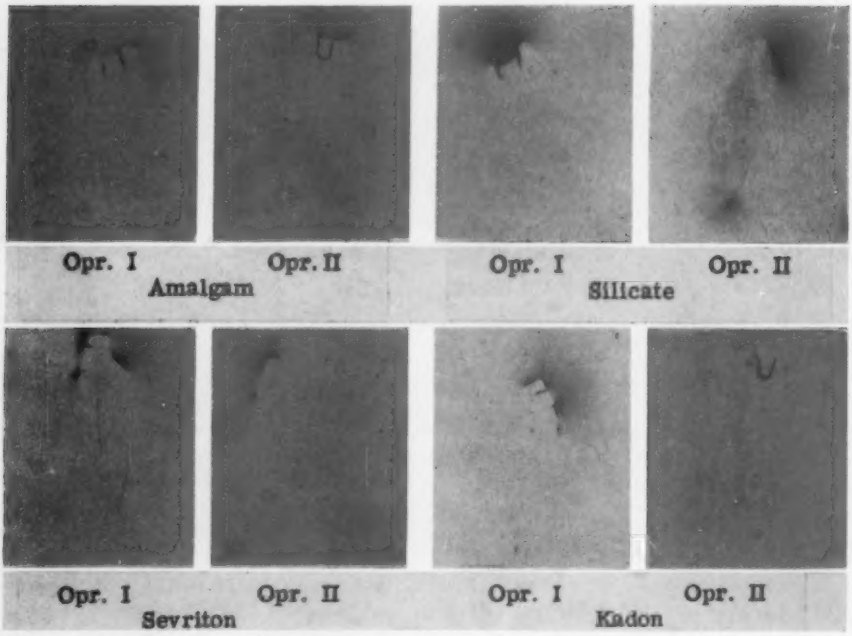

Fig. 15 • The range of results obtained by two different operators who were handling the same materials

be established only through future research. It is felt, however, that these tests have provided an accurate picture of the relative adaptation of different materials and there are few who would deny the desirability of a material or technic which would seal the cavity effectively.

SUMMARY

The relative sealing abilities of six different restorative materials placed in extracted teeth by different technics were determined on the basis of the marginal permeability to Ca^{45}.

The margins of 24 hour old amalgam restorations were readily penetrated by Ca^{45}, but leakage diminished with aging of the restoration. Cavity varnishes appeared to improve the marginal seal of these restorations.

Some leakage was observed with all silicate and zinc phosphate cement restorations. There was no detected change in the adaptation six months after placement. There was considerable sorption of the isotope by the materials.

The use of the recommended cavity liner improved the adaptation of resin restorations. Leakage increased when the restorations were subjected to thermal changes and the magnitude appeared to be directly related to the temperature differentials used.

These data compare favorably with those obtained in comparable tests made with in vivo restorations. Thus the use of such in vitro test procedures to obtain further information regarding the relative adaptation of other materials placed by various technics is strongly suggested.

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Psychologic Aspects of Smoking • The whole concept of orality leads us to the most important dynamic force operative in perpetuating the smoking habit. The earliest sensual pleasure for the human is in the act of suckling. It has been proved that this is a universal and necessary gratification and extends far beyond the simple need for nourishment. The need for this kind of oral sensual gratification is most primitive and strong, persists long after weaning, and extends into adult life. The infant tests every new object by putting it in his mouth, and even after this is abandoned there always appear remnants of this in thumbsucking, nailbiting, pencil-gnawing, gum-chewing and other activities indicating a partial fixation or regression to this earliest form of pleasure. We see an increase in these activities in the face of stress and frustration in the child. This indicates a return to a simple pleasure as a response to frustration at a more complex and mature level. The adult smoker increases his smoking in exactly the same way in the face of stress and frustration. When the smoker is forced to give up this gratification, one always finds a reversion to some other form of orality in such form as nailbiting, compulsive eating, drinking or gum-chewing. We have all seen the abstaining smoker with an empty pipe or an unlit cigar in his mouth or "dragging" on an unlit cigarette. *Maurice J. Barry, Jr., Psychologic Aspects of Smoking, Proc. Mayo Clinic 35:386 June 22, 1960.*

Roentgenographic and direct observation of experimental lesions in bone: I

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Artificial lesions simulating pathological conditions were made in mandibles from human cadavers. Roentgenograms of the lesions were made and compared with the specimens of bone. Lesions in cortical bone can be detected roentgenographically only if there is perforation of the bone cortex, erosion from the inner surface of the bone cortex, or extensive erosion or destruction from the outer surface. Lesions in cancellous bone cannot be detected roentgenographically. Extensive disease of bone may be present even when there is no evidence of it on roentgenograms.

It is not uncommon to find clinical signs of bone disease in spite of negative roentgenographic findings. For example, in many instances of acute alveolar abscess, even though pus is draining through the root canal, no changes can be detected by roentgenographic examinations. In many of the acute total pulpitides the initial roentgenograms fail to indicate pathological changes, yet roentgenograms taken several days later may show changes in the apical tissues.[1] Periodontal lesions involving the bifurcation are not always seen on roentgenographic examination. Roentgenograms taken after extraction of teeth often fail to show distinct areas of rarefaction, in spite of the extensive cavitation. The trabeculae over the sockets appear normal and if the lamina dura could somehow be obliterated there would be no way of determining roentgenographically that a tooth had been removed recently. Instrumentation of the root canal beyond the apex with reamers and files usually does not produce roentgenographic changes in the trabecular pattern of bone even though the instruments have displaced some of the cancellous bone. In acute mastoid, march fracture, and osteomyelitis, roentgenograms also often appear negative.

Thus it seems that extensive bone destruction may occur under some conditions without being detectable through changes in radiolucency. The purpose of this study was to find out under what specific conditions bone destruction in vitro was not detectable by roentgenographic examination, and to correlate the known location and extent of artificially produced bone lesions with the roentgenograms of those lesions. The general procedure was to create lesions of various sizes, gradations and anatomic locations in mandibles. The visible evidence of bone destruction was then compared with the appearance of these lesions in the usual dental roentgenograms.

MATERIALS AND METHOD

Human mandibles obtained at necropsy were studied. Both wet and dry specimens were used. Color photographs and roentgenograms of the specimens were taken prior to experimentation. The mandibles were cut into block sections. Experimental lesions of various types were then made with diamond stones, endodontic reamers, files and dental burs. Roentgenograms were made of the experimental lesions in the bone sections. All roentgenograms were taken at the same target film distance and angulation (except for the deliberate variation of angulation described in the first experiment). All films were exposed for two seconds at 65 kvp, 10 ma. and were developed together for three minutes.

EXPERIMENTAL EVIDENCE

Effects of Depth of Lesions in Cortical Bone • Holes were drilled into a section of the mandible with round burs of various sizes (no. 2 to no. 8). The buccal plates were drilled (1) to a depth of 1 mm., (2) halfway into the buccal cortex, (3) all the way through the buccal cortex (perforation) and (4) deep enough to perforate both buccal and lingual bone plates. Roentgenograms of these artificial lesions were taken at various angulations.

Effect of Depth • Lesions 1 mm. deep did not appear on the roentgenogram, regardless of the size of bur used. As the depth of lesions increased there was greater radiolucency and the shadows became more pronounced, irrespective of bur size. Thus loss of a superficial layer of the outer surface of bone is not ordinarily detectable. As more and more bone is removed from a given region from the outer cortex inward the shadow deepens and the area of rarefaction becomes more pronounced, hence more readily observed.

The roentgenograms were similar, whether taken from the buccal or lingual side. From the roentgenographic evidence alone it would not have been possible to determine on which side the lesions had been made.

Effect of Angulation • As the roentgenographic angulation was increased, the rounded shadows became elongated and their densities decreased. These effects of angulation were especially pronounced for perforations. The elongation of shadows increased with the depth of the cut as well as with the degree of angulation, a fact to be taken into consideration in evaluating roentgenograms. It was not so much the diameter of the bur as it was the depth of the cut that produced a recognizable lesion (Fig. 1).

The angulation effect provides an explanation of the roentgenographic images of the nasopalatine and the mental foramens. At some angulations, particularly in roentgenograms of the nasopalatine area, the image produced is more cylindrical than circular. In an occlusal film, made with the x-ray tube positioned on the foramen, a more distinct circular shadow is obtained.

Artificial Lesions in Cancellous Bone • The cancellous bone of the mandible was drilled to various depths and roentgenograms were made. No evidence of drilling could be seen in the roentgenograms. More and more cancellous structure was removed until there was a complete hollow within the bone. All the bone marrow was removed up to the junction of the innermost surface of the cortex and the cancellous portion of the bone. Roentgenographic examination still failed to show changes in the trabecular pattern of the bone or in its radiolucency. When a bur eroded the innermost surface of the bone cortex a clear and distinct radiolucent shadow appeared.

This evidence indicates that destruction of the cancellous portion of the bone does not produce changes discernible in roentgenograms taken under the conditions de-

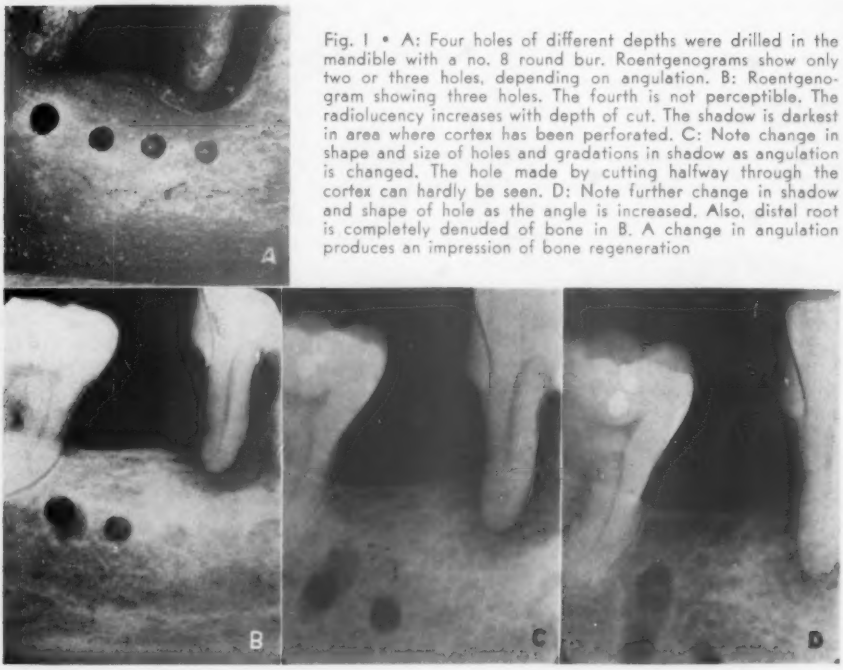


Fig. 1 • A: Four holes of different depths were drilled in the mandible with a no. 8 round bur. Roentgenograms show only two or three holes, depending on angulation. B: Roentgenogram showing three holes. The fourth is not perceptible. The radiolucency increases with depth of cut. The shadow is darkest in area where cortex has been perforated. C: Note change in shape and size of holes and gradations in shadow as angulation is changed. The hole made by cutting halfway through the cortex can hardly be seen. D: Note further change in shadow and shape of hole as the angle is increased. Also, distal root is completely denuded of bone in B. A change in angulation produces an impression of bone regeneration

scribed. Changes become manifest only if there is encroachment on the innermost surface of the cortical bone or if there is frank perforation (Fig. 2 and 3).

Artificial Lesions in the Cortex and its Junction with Cancellous Bone • A block section of the mandible was prepared in the manner previously described. The cancellous bone up to the junction with the cortex was removed and a roentgenogram was taken. Then the bone was split in half mesiodistally, to yield separate lingual and buccal plate sections, each consisting of cortex and trabeculae at the junction. In the lingual section, the trabeculae at the junction were scraped with a bone chisel. In the buccal section, the tissue at the junction was left undisturbed. Roentgenograms of the section with junction trabeculae reduced, showed loss of trabecular structure or pattern. The bone had a foamy appearance (Fig. 3,C). Roentgenograms of the section with junction trabeculae intact showed an intact trabecular pattern (Fig. 3,D).

A part of the separate buccal plate was sliced sagitally from the outer surface with a diamond stone to remove the cortical bone (Fig. 3,G,H,I). The other part was not cut so that comparative effects could be observed on the same specimen. The cortex was removed until the junction area of the cortical and cancellous bone was exposed. The specimen thus produced was about 2 mm. thick. Bur marks were then drilled in (1) the outer surface of the buccal plate, (2) the inner surface of the junction area where the outer buccal plate had not been removed and (3) the inner surface of the junction area where the cortex had been removed.

Roentgenograms revealed definite and

distinct areas of rarefaction where the bur had been drilled into the inner or outer surface of the cortex. The bur mark was barely discernible in the junction area although the bone was almost perforated. The trabecular pattern was intact on both sides of the bone, but there was a pronounced difference in the densities (Fig. 3,E and F).

From these experiments it may be inferred that areas of rarefaction manifest themselves only if there is erosion of the cortex from the inner or outer surface or if there is frank perforation. The trabeculae indicated on the roentgenograms are those which are present at the junction of cortex and cancellous bone. If the trabeculae in the interior of the cancellous bone or in the marrow are destroyed, the difference of the trabecular pattern on the roentgenogram is not disturbed.

Trabecular Patterns in Roentgenograms of Intact and Dissected Junction Areas • A mandible obtained from a 48 hour autopsy specimen was sectioned and graded amounts of cortex were removed from a portion of both lingual and buccal sides. Graded amounts of the junction area also were removed so that a 3 mm. and a 2 mm. thickness of cancellous bone remained.

In roentgenograms, the trabecular pattern and trabeculae could be seen when the junction was not encroached upon. As more and more of the junction area was removed, the bone became more radiolucent and the trabeculae and the trabecular pattern became more difficult to discern (Fig. 4). The inference is that the trabecular pattern originates at the junction of the cortex and cancellous bone.

Changes in trabecular pattern were the same whether bone was removed from the junction area on the outer (cortical) side or trabecular extensions were reduced in depth from the inner (cancellous) side at the junction area.

When the bone plate over dentigerous regions is removed completely, changes in pattern do not readily occur because the lamina dura has junction areas of cancellous bone that affect the ultimate

Fig. 2 • A: After cancellous bone has been removed. There is no apparent evidence of any disturbance. B and C: Specimen of bone showing amount of cancellous structure that was removed. Notched area is part of lingual canal. D: Side view shows absence of cancellous bone and small amount of trabeculae present at the innermost surface of the bone cortex. Trabeculae are absent in notched area that forms lingual aspect of mandibular canal. Roots of molar tooth articulate with the buccal cortex. Distal root appears to be within cancellous bone

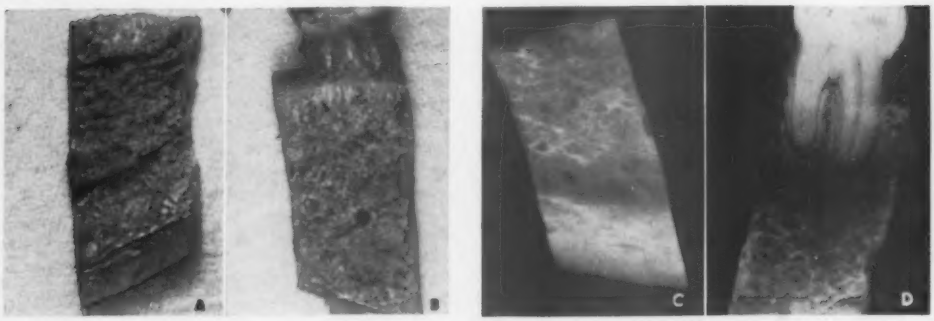
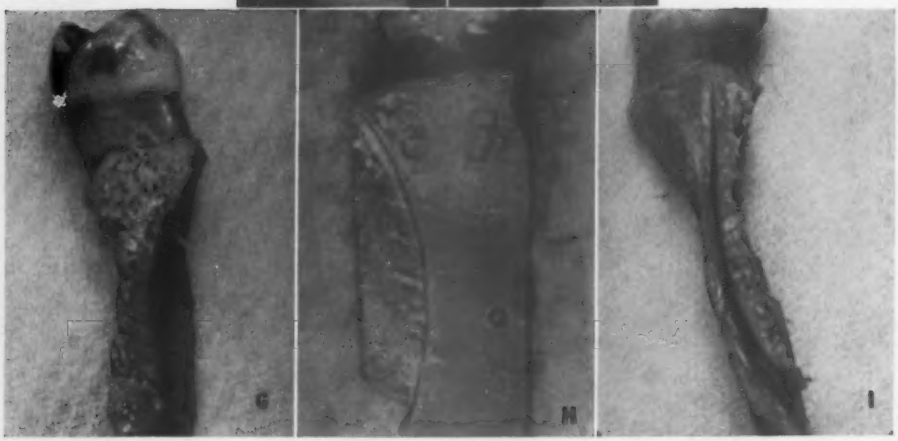


Fig. 3 • The split halves of bone specimen in Figure 2 are shown above. A: The lingual portion in which the trabeculae were scraped. Foamy appearance can be seen in the roentgenogram, C, as a result of reducing trabecular structure. Mandibular canal can also be seen. B: Buccal portion in which the trabeculae were left intact. The roentgenogram, D, was taken prior to drilling holes in trabecular structure. E: Before removal of buccal plate up to the junction area. Note that trabecular pattern can still be discerned. F: Showing distinct areas of radiolucency as a result of drilling the cancellous and cortical bone to the junction area from cancellous and cortical sides. G, H and I: Specimens of bone illustrating side views, the sagittal cut to the junction area and the bur mark drilled to junction area. Note denuded areas of bone on root surface



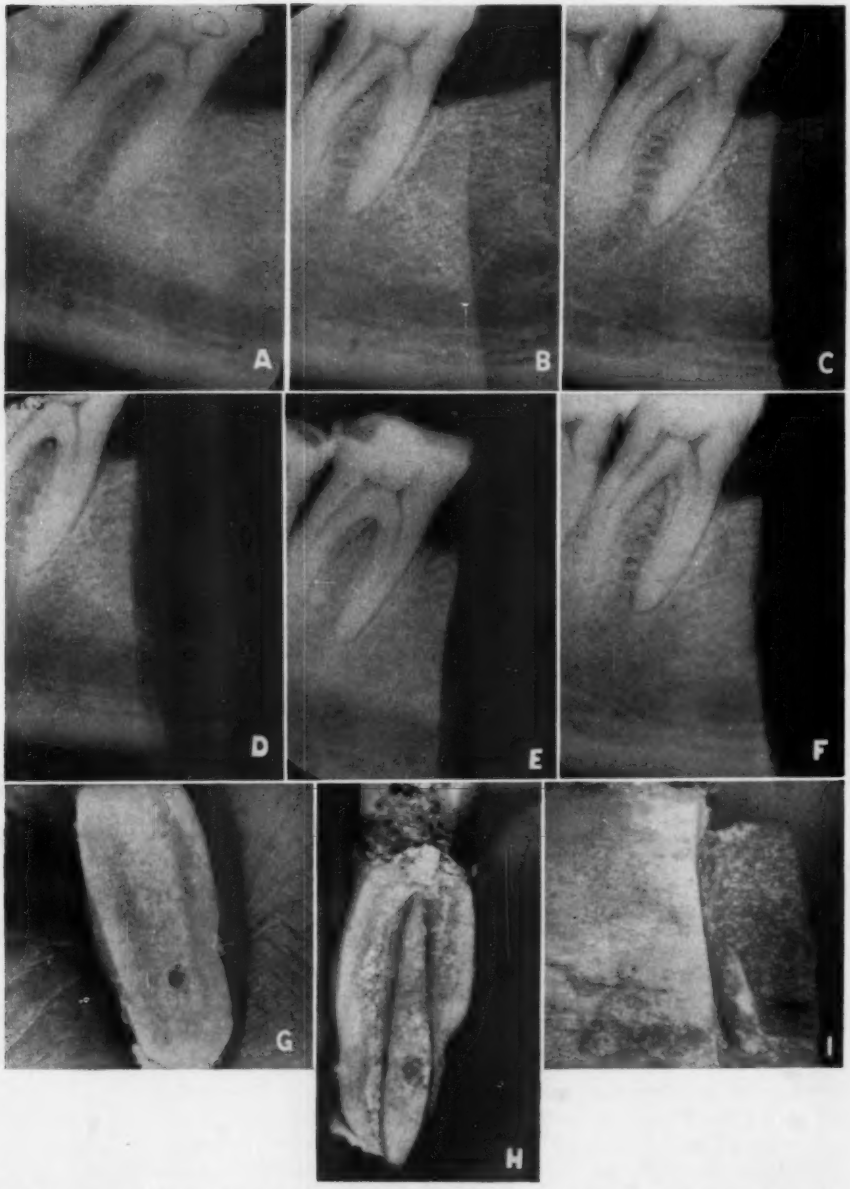


Fig. 4 • Roentgenographic changes occurred as cortical bone was removed mesial to first molar. When junction area of bone was removed there was loss of trabecular pattern with hardly any visualization of cancellous structure. A: Before cortex was removed. B: After removal of buccal plate to junction area. C: After removal of lingual and buccal plate. Some junction area is present. D: Further removal of junction area. E and F: Complete removal of junction area. Views from lingual and buccal sides respectively. G: Specimen before experiment. H and I: After experiment

trabecular appearance. This explanation is in accord with the observations of Goldman, Millsap and Brenman.[2]

Cancellous bone is comparatively radiolucent and it is less dense than cortex or alveolar bone proper. The alveolar bone proper is dense because of its relatively smaller content of fibrillar matter and large content of cementing substance. The cementing substance is particularly dense because of its greater content of calcium salt per unit volume.[3] Superimposition of bone or a montage can increase the bone quantity to such an extent that the effect of greater density is produced in the roentgenograms. This effect is observed, for instance, in roentgenograms of the external and internal oblique ridge region.

Other Observations • The nutrient canals could be seen roentgenographically only when they were present in the bone cortex. For direct examination, the foramens were located with endodontic reamers or files and then dissected out by removing the buccal or lingual plate of bone with diamond stones. The nutrient canals were observed as small tubes that traverse the cortex vertically on the buccai side. They also traverse the cortex in a general horizontal direction (penetrating the bone at a 45 degree angle) on the lingual side in the region of the genio tubercles as shown in Figure 5.

The mental foramen was most radiolucent when the central beam was parallel with the orifice. At 180 degree angulation the foramen appeared darker and more distinct; at 90 degrees it appeared less dark and more diffuse. The roentgenographic image of the foramen opening varied from circular to funnel shaped.

The mandibular canal appeared more distinct and rarefied when the cortex was removed. Examination of the specimens in some instances showed the canal notched throughout the body of the mandible in the molar and bicuspid region on the lingual side. In other instances the canal was surrounded by a distinct layer of bone plate suspended in the cancellous structure.

The roots, in several instances, appeared to be denuded of buccal bone near the apical third (Fig. 3,F). This condition could not be detected by means of roentgenograms. In many instances the bone was extremely thin in the apical areas on the buccal side. Such denuded areas were not observed on the lingual side.

The teeth were encased completely in lamina dura which joined with the outer cortex. The alveolus and the lamina dura are cortical bone; the lamina dura therefore has a junction area in contact with trabeculae. The presence of lamina dura accounts for the greater amount of trabeculae found in dentigerous regions, especially between the teeth and towards the alveolar ridge (Fig. 3,D).

Where the alveolar process was thick in the molar region and there was a layer of cancellous bone between the lamina dura and the cortical plate, trabeculae could be seen across the roots of the teeth on the alveolar process. The bone appeared normal when the teeth were extracted. Where the cortex was thin, or thick but with no intervening cancellous bone, the bone specimen had a foamy appearance and trabeculae could not be seen in the region where the teeth were extracted.

DISCUSSION

The assumption that results obtained with cadaver material are valid for bone under clinical conditions receives support from the experimental work of Ardran.[4] He removed about one half inch of the inner cancellous structure of vertebrae obtained from human cadavers and found that the artificial lesions could be seen in roentgenograms taken laterally. When water was put into the bone cavities, the lesions could not be seen from any angle. In such experiments water is

added to produce an environment more closely approximating the radiolucency of the tissue fluid associated with bone in vivo. Ardran's work seems to indicate that roentgenographic examination of bone in vivo would be even less discriminating than it would be for specimens obtained from cadavers.

There is much histologic evidence of apical or periodontal disease without roentgenographic manifestation. A review of Burket's[5] protocols of human necropsy material shows that in many instances roentgenographic examination yielded negative results when cancellous bone was diseased, and sometimes even when cor-

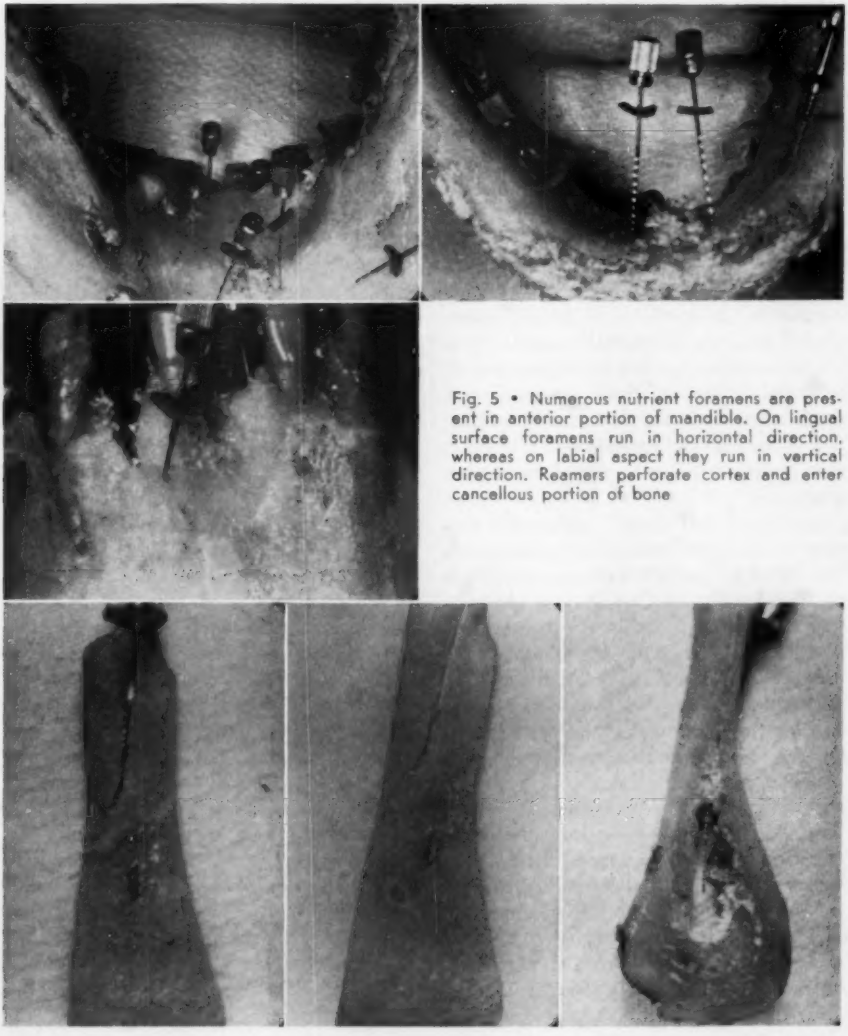


Fig. 5 • Numerous nutrient foramens are present in anterior portion of mandible. On lingual surface foramens run in horizontal direction, whereas on labial aspect they run in vertical direction. Reamers perforate cortex and enter cancellous portion of bone

tex was involved—probably because only superficial cortex was removed.

Goldman, Millsap and Brenman[2] observed that the removal of the buccal and lingual alveolar plates had no effect on the trabecular pattern around the teeth. This observation is not contrary to our finding that trabecular patterns change if the innermost surface of the cortex is removed. They did not attach any significance to the junction area; they were describing the region around the teeth in a dry specimen, whereas we were observing the body of the mandible in a wet specimen. In and around the teeth there is more cortex, crestal bone or lamina dura, and therefore more junction surface to exhibit trabeculae. Where junction surface is present the trabecular pattern does not change.

In view of the experimental evidence presented, early stages of bone disease cannot be detected by means of roentgenograms. Also the size of a rarefied area on the roentgenogram is not correlated with the amount of tissue destruction. A small area of rarefaction can be indicative of as much or more bone destruction as a large rarefied area on the roentgenogram.

The afore-mentioned experiments emphasize that routine roentgenograms may not detect the presence of secondary neoplasms or inflammation causing bone destruction. Whereas this point has been recognized for minute lesions, it has not been realized that large lesions may go undetected with the usual roentgenographic procedures. Early metastatic carcinoma in bones often cannot be detected by means of a roentgenographic examination, even though the patient has bone pain. As the disease progresses it destroys more of the marrow spaces, invades the cortex and produces lesions which show up on roentgenograms. Shackman and Harrison[6] have demonstrated that a patient may have extensive metastases without demonstrable roentgenographic abnormality. However, with tomography large areas in cancellous bone may be detected by tomograms made in the correct plane.

Although similar experiments have not been made on the maxilla, similar findings could reasonably be expected.

SUMMARY

Mandibles from human cadavers were dissected and artificial lesions were made to simulate pathological conditions. A comparison was made of roentgenograms with the actual sections of bone, as observed visually.

It is evident from these experiments that, by the methods ordinarily employed for taking roentgenograms, lesions in cortical bone can be detected roentgenographically only if there is perforation of the bone cortex, erosion from the inner surface of the bone cortex, or extensive erosion or destruction from the outer surface. Lesions in cancellous bone cannot be detected roentgenographically.

The apparent cancellous destruction that is manifest on roentgenograms is really an erosion of the innermost surface of the bone cortex at the junction area between cortex and cancellous bone.

No defect can be visualized beyond the junction area as it encroaches on the marrow spaces.

Extensive disease of bone, therefore, may be present even when there is no evidence of it on roentgenograms.

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A cross-sectional study in dental development and skeletal age

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To investigate the relationship between tooth root age, bone age and number of erupted permanent teeth, 132 white children ranging in age from 61 to 82 months, were examined roentgenographically. High positive correlations were found between the root age of the lower right first permanent molar and the bone age, and between the root age and the number of erupted permanent teeth. A long-range roentgenographic study of bone age, root age and number of erupted teeth would contribute significantly to the creation of an atlas of dental development that would be useful clinically.

The search for more detailed understanding of the developmental coordination between organ systems of the human body is an unending process. One objective of this search is to establish standards of reference for biologic development.

These standards which measure growth and maturation are necessary when evaluating developmental progress of the individual patient. Without such references, the clinician may not be able to estimate deviations from the normal range.

For the dental practitioner, this need can be expressed by the following questions encountered in practice:

1. "When will Johnny get his first permanent tooth?"
2. "Will children mature more rapidly when their teeth erupt earlier than the average child of the same age?"
3. "To what extent do dental and skeletal maturation indicate the rate of dentofacial growth?"

In order to answer these questions, the dentist needs acceptable standards and correlation indexes of dental and skeletal age as a comparison for his individual patients. These indexes are generally derived from longitudinal roentgenographic data of dental and skeletal structures. Roentgenograms of the ossification centers of the hand, knee, scapula, and so forth have been used to establish reliable standards of skeletal age. Atlases on skeletal age, which are appreciably reliable, have been developed by Todd,[1] Greulich and Pyle,[2] Acheson,[3] and others. Greulich and Pyle[2] found a close relationship between the maturation of the skeletal and reproductive systems and were able to predict the occurrence of menarche to within three months several years before the event. The predictions were based on the roentgenographic examination of the degree of epiphyseal fusion in the phalanges of the hand and carpal development of the wrist.

Whereas atlases of skeletal development based on longitudinal data of large samples of children have been available

for many years, similar atlases of dental development are not available. The standards of dental development established by Schour and Massler,[4] Kronfeld,[5] and others are based on cross-sectional studies with no distinction between sexes, prenatally and postnatally. These standards are useful in imparting a general idea of human dental development. However, they lack the reliability that atlases of skeletal development have achieved in the prediction of future development.

The reason for the lag in construction of a dental development atlas may be due largely to the difficulty of achieving serial nondistorted roentgenograms of the developing teeth and lack of adequate embryologic material (Kraus[6]).

It would be ideal if a reliable and verifiable atlas of root calcification existed. This could be utilized with the existent atlas of bone age to correlate bone age and root calcification in an adequate sample of children. Such root calcification indexes are only now being developed (Noyes, Savara, and Dachi,[7] Nolla,[8] and others).

Since bone age bears a close relationship to the maturation of the reproductive system, it appeared plausible that bone age might have a similarly close relationship with root calcification. It is possible under the present state of knowledge to devise only a quasi root age standard. This quasi root age can then be correlated with bone age and the number of permanent teeth present in the child's oral cavity. A concept of the degree of relationship between dental development and bone age then can be proposed.

A child's dental development at a given age can be assessed by counting the number of teeth present in his mouth and comparing this number to his peer group. In a sample of more than 1,000 Japanese children between 7 and 14 years of age Sutow, Terasaki and Ohwada[9] found that among children of the same age those having advanced skeletal development had a greater number of erupted permanent teeth than those with a lesser skeletal development. Demisch and Watermann[10] established root age indexes for third molars. They found a high positive correlation between this root age and bone age.

DEFINITION OF TERMS

A definition of the terms used in this investigation follows:

Dental development: the degree of root length and contour at chronologic age roentgenogram was made. The number of permanent teeth partially or completely erupted into the oral cavity.

Quasi root age, root age: the degree of root length and contour at the chronologic age roentgenogram was taken. This is specified in years and months.

Number of permanent teeth present: the sum of permanent teeth present in the oral cavity.

Bone age, skeletal age, skeletal development: the assignment of an age in years and months to a child by a series of assessments of his carpal and epiphyseal development as indicated by a roentgenogram of his hand and wrist and compared to a bone age atlas. The bone age is derived from the standards established by Greulich and Pyle.[2]

Investigation of the literature reveals few studies of dental development and bone age at six years of age. It is, therefore, the purpose of this pilot investigation to determine if, in a group of 132 children with an average age of six years (Table 1), a quasi root age of the right first permanent molar has a significant, positive correlation with the following factors: (1) the number of erupted permanent teeth, (2) the bone age, and (3) the chronologic age.

It is significant that in this investigation, the quasi root age of the right first permanent molar had a high rank order correlation with the number of perma-

Table 1 • Characteristics of population studied*

	Chronologic age				Bone age				Root age				Number of teeth			
	No. of cases	Mean	Range	Std. deviation	No. of cases	Mean	Range	Std. deviation	No. of cases	Mean	Range	Std. deviation	No. of cases	Mean	Range	Std. deviation
Total pop.	132	71.6	61–82	4.8	114	55.8	36–106	12.7	122	72.9	48–96	11.48	131	2.7	0–10	2.7
Total girls	59	73.2	71–82	5.0	54	62.0	42–106	14.02	54	75.5	60–96	10.95	59	2.8	0–10	2.65
Total boys	73	71.2	63–82	4.66	60	50.8	36–96	11.63	68	70.9	48–96	11.94	72	2.6	0–10	2.12

*The ethnic background of the children studied is: 96 children, both parents born in the United States; 15 children, one parent born in the United States and one in Central Europe; 10 children, one parent born in Cuba, Mexico or Puerto Rico; 9 children, both parents born in the Mediterranean or Central European areas; 2 children, one parent born in the United States and one in the Scandinavian countries.

nent teeth erupted, the bone age and the chronologic age.

Girls, during growth and development, are more advanced in many respects than boys. On the average, in girls the epiphyseal union, ossification centers and secondary sexual characteristics appear earlier.

The present investigation revealed that in the six year old girls studied, their permanent teeth erupted earlier than those of the six year old boys and root formation tended to be more advanced than in their boy peers. These findings are confirmed by the investigations of Garn and others,[11] Gleiser and Hunt,[12] and Hurme.[13]

In the deciduous dentition, however, Meredith[14] found a slight tendency for the teeth of two year old boys to erupt earlier than those of girls of the same age. Pyle and Drain[15] in a longitudinal study of children two to six years of age found that boys' teeth mature slightly earlier than girls.

METHODS AND MATERIALS

One hundred and thirty-two American born, white children aged five years and one month to six years and ten months were examined.

Roentgenograms were taken of each child's hand and wrist and the lower right first permanent molar. At the same visit, the erupted permanent teeth in the child's mouth were counted and recorded.

The number of teeth present was determined by counting all the permanent teeth in the child's mouth regardless of the degree of eruption beyond the gingiva.

Quasi root age was determined by comparing and rating the intraoral roentgenograms of the right first permanent molar to the most similar category in Table 2.

Each child's bone age was determined by the method given in the atlas of Greulich and Pyle.[2] The chronologic age was determined at the time the examina-

Table 2 • Quasi root age standards of lower right first permanent molar

Root age	Intra-oral roentgenographic findings
3 years	Crown complete. No root present.
4 years	1–2 m.m. of thin lateral finger-like projections of root formations. (Slight root formation.)
5 years	2–3 m.m. root developed with thickening of pulpal walls. No bifurcation.
6 years	Root bifurcation present. No more than 3 m.m. of root extending apically beyond the most coronal point of bifurcation.
7 years	4 m.m. or more of root extends beyond most coronal point of bifurcation. No tapering of root apex. Wide open apical foramen.
8 years	Open foramen. Suggestion of tapering of root. Total root length almost complete.
9 years	Root length almost complete. Apical foramen closing. Definite tapering.

tion was made and the roentgenograms were taken.

The method of correlating the data was determined by using Spearman's rank order coefficient ρ. (Kendall[16]) which was corrected for ties. Spearman's ρ is:

$$\rho = 1 - \frac{6 \Sigma (d^2)}{n (n^2 - 1)}$$

OBSERVATIONS

The rank order correlation between the root age of the lower right first permanent molar and the bone age showed the highest correlation index (.437). This suggests an intimate developmental relationship between root age and bone age. The probability of this correlation occurring as mere chance is slight, less than 1 in 100 (Table 3).

The rank order correlation between the root age of the lower right first permanent molar and the number of erupted permanent teeth showed the second highest correlation index (.426). This suggests that eruption of the teeth bears a close relationship to root development. The probability of getting an extreme value by chance is less than 1 in 100 (Table 3).

The rank order correlation between the root age of the lower right first permanent molar and the chronologic age bore an index of .324 with less than a 1 in 100 probability of its being a chance occurrence. This suggests that root age and chronologic age bear a relationship of lesser intimacy than the afore-mentioned two categories (Table 3), but a closer relationship to chronologic age than chronologic age does to bone age and number of teeth.

The rank order correlation between the chronologic age and the number of erupted permanent teeth bore an index of .378 with less than a 1 in 100 probability of the index being a chance phenomenon. A positive relationship between these two factors exists. It is not as intimate as the indexes for root age-bone age and root age-number of teeth (Table 3).

The rank order correlation between the bone age and the number of permanent teeth erupted in the oral cavity showed that, although there is a positive relationship between these two factors (.208), it is the lowest of the six indexes determined (Table 3). There is less than a 1 in 100 probability of this index occurring by chance.

The six year old girls were more advanced than the six year old boys: mean bone age girls 62.0 months, boys 50.8 months; mean root age girls 75.5 months, boys 70.9 months; and number of erupted permanent teeth girls 2.8, boys 2.6 (Table 1).

DISCUSSION

Root formation and bone formation are both connective tissue responses, and a close correlation might be expected. This study presents evidence that root age bears a high rank order correlation with bone age and number of erupted perma-

Table 3 • Rank order correlations of the one-hundred and thirty-two children

Characteristics	Rank order correlation	Corresponding normal deviate	Probability of getting an extreme value by chance under null hypothesis
Chron. age and root age	.324	3.58	<.01
Chron. age and bone age	.292	3.10	<.01
Chron. age and no. of teeth	.378	4.33	<.01
Root age and bone age	.437	4.50	<.01
Root age and no. of teeth	.426	4.67	<.01
Bone age and no. of teeth	.208	2.22	>.01 to <.05

nent teeth in the mouths of 132 six year old children. Root formation may be as good a maturation indicator as bone age is. Only longitudinal root age studies similar to the type done with skeletal age can advance this hypothesis further.

Rank order correlations, such as these, with probability significance of less than 1 in 100 are sufficiently adequate to establish the existence of a significant relationship between root age, bone age and number of teeth.

Because root age indexes must be further refined to become a reliable index, no attempt was made to determine the degree or detailed structure of root age relationship to bone age and number of teeth. All that could be determined with the available data was the rank order correlations.

It is interesting to note that bone age and root age bore the highest rank order correlation and bone age and number of teeth bore the lowest rank order correlation. In this study, the correlation between chronologic age and bone age bore the second lowest index (.292). This was to be expected. It indicates the possibility that two factors, (1) a definite maturation phenomenon, namely, bone age, and (2) root age, a maturationlike phenomenon, have a greater interrelationship than do eruption of teeth, chronologic age, or both, with maturation (bone age).

The data presented suggest that the more advanced the bone age, the more advanced the root age. Although bone age did not bear a high rank order correlation to number of teeth, the root age did bear a high rank order correlation to number of teeth. This indicates a close relationship between root formation and eruption time of teeth.

These findings coincide with those of Sutow, Terasaki, and Ohwada,[9] Demisch and Watermann,[10] and others.

A first step or method toward testing the clinical reliability of predicting root age from skeletal maturation, or vice versa, has been hypothesized.

This cross-sectional study indicates a high degree of relationship between bone age and root age, and root age and eruption time of permanent teeth. It strongly supports the premise that a longitudinal study of these three factors and dentofacial development is now indicated and could result in a reliable and clinically useful atlas. This atlas could aid the dentist in: (1) predicting eruption time of teeth, (2) predicting dentofacial patterns and consequently aid in the treatment of certain pattern disharmonies and (3) predicting general body development. Such a long-term study would require the use of some form of cephalometric roentgenography.

In osseous maturation, sexual differences are pronounced. In dental development, although these differences are pro-

nounced, they are of a lesser magnitude than osseous maturation. The differences between the findings of Meredith[14] and other investigators (Garn, and others,[11] Gleiser and Hunt,[12] Hurme,[13] and the present investigation) are not comparable, since Meredith's observations were on the deciduous dentition and the others were on the permanent dentition.

Contrary to the findings of Pyle and Drain[15] it was found that six year old girls are moderately more advanced in their dental development than six year old boys. This disparity might be explained by the differences in criteria between the two investigations.

Why this sexual difference in dental development exists is not clear. But the question reveals an additional need for determining sex-specific, quantitative norms for permanent tooth development.

SUMMARY

One hundred and thirty-two white children ranging from age 61 months to 82 months (Table 1) were studied to investigate the relationship between their root age, bone age and number of erupted permanent teeth. Intraoral and hand and wrist roentgenograms were taken of each child and, at the same visit, the number of permanent teeth present in the child's mouth was counted.

The bone age, root age and number of teeth present were recorded for each child. Rank order correlations were determined from these data.

CONCLUSIONS

The study demonstrated the following:

1. Those children with advanced root age had advanced bone age. Conversely those with a comparatively younger root age had a younger bone age.

2. The number of permanent teeth erupted in the child's mouth did not bear a high correlation to the child's bone age.

3. The child's root age increased as the number of permanent teeth erupted in the mouth increased.

4. Chronologic age bore a positive correlation to number of erupted permanent teeth (.378), root age (.324) and bone age (.292). These correlations, however, were considerably lower than the significantly higher correlations of root age to bone age (.437) and root age to number of teeth (.426).

5. The probabilities of getting by mere chance the correlations observed were less than 1 in 100 under the null hypothesis.

6. It now appears reasonable to hypothesize that a longitudinal, sex-specific cephalometric roentgenographic study of bone age, root age, and number of erupted teeth would contribute significantly to the creation of an atlas of dental development that could be clinically useful in the following instances: the prediction of the eruption time of teeth for boys and girls; the treatment of dentofacial disharmonies, and the root age serving as a criteria of the developmental status of the child.

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Retention, resistance and esthetics of the anterior three-quarter crown

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The anterior three-quarter crown is being used less than formerly. Although it has its indications and contraindications, the anterior three-quarter crown can be utilized satisfactorily in many instances if rules for its preparation are followed fairly rigidly. Steps in the development of a successful three-quarter crown are discussed.

Since the advent of the high-speed method of removing tooth structure, dentists are turning more and more to the complete crown as a restoration for the single unit replacement, for bridge retainers and for splints. This seems to be true for restorations in all regions of the mouth—anterior, posterior and upper and lower arches.

Conversations with dentists from most sections of the country indicate that the anterior three-quarter crown is being used less than formerly. The following reasons are generally given: (1) esthetics of the anterior three-quarter crown is undesirable and (2) resistance and retention are poor.

Like all dental restorations, the anterior three-quarter crown has its indications and contraindications; perhaps its applicability is somewhat limited, but, if the rules for its preparation were followed fairly rigidly, the anterior three-quarter crown could have been utilized effectively on many teeth which have been reduced severely on the labial surface in order to provide room for camouflaging material on a complete gold crown.

INDICATIONS AND CONTRAINDICATIONS

Thick, square teeth are the most suitable for employment of a three-quarter crown. These teeth have an adequate bulk of dentin between the lingual and labial enamel plates for accurate placement of substantial retentive proximal grooves. A tooth of this type generally possesses a bulky cingulum, which, if correctly reduced, adds greatly to the retention of the casting. It is difficult to make a good preparation on a thin, "shovel-shaped" anterior tooth or on a tooth with extreme lingual abrasion. Such teeth, because of their small amount of dentin, do not lend

themselves to correct groove placement or to the use of auxiliary retention methods. Substantial grooves which would retain a bridge cannot be placed and attempts to do so may leave undermined enamel through which the restoration is reflected.

Extensive interproximal caries can negate the use of a three-quarter crown because of the short dimension of the lingual wall of the box modification which must be used in these instances. Also, such carious areas often involve the facial surface to such an extent that silicate cement fillings would have to be placed or the proximal slices must be carried so far onto the labial surface as to display a very unesthetic amount of metal. However, certain teeth with extensive caries can be successfully restored with the three-quarter crown if the tooth is in good enough condition that the operator is able to employ auxiliary methods for increasing the retention.

Alignment in the dental arch must also be considered. Good alignment of the abutment tooth facilitates the development of a preparation which will retain a dental bridge and will have the proper esthetic qualities. Often an anterior tooth which is otherwise well qualified for a three-quarter crown is tipped, rotated, or out of position in the arch in such a way that it cannot be aligned with the other abutment teeth to allow for seating of the fixed bridge. The employment of a three-quarter crown on this type of tooth may require overcutting to such an extent that the pulp tissue would be endangered and metal display would be extreme.

PRECAUTIONS IN PREPARATION

The Proximal Cuts • Making the proximal cuts is an important step which is often done incorrectly. The labial margins are frequently brought too far labially, resulting in excessive display of metal and unnecessary destruction of tooth tissue. A lead pencil, sharpened to a long, fine point, can be used directly on the tooth being prepared to establish a guide for the labial extent of the proximal cuts. If there is an approximating tooth, the pencil point is directed interproximally, and by laying it on the approximating tooth, which serves as a guide, the operator can scribe the ideal labial extent of the proximal cut (Fig. 1).

The inclination of the disk, both gingivoincisally and lingually, is critical. Incisally, the planes of the two proximal cuts should converge just enough to allow the withdrawal of a wax pattern. Labiolingually, the two planes converge lingually toward the cingulum. Incorrect angulation of the disk gingivoincisally can result in unfavorable effects:

1. Undercuts or shoulders along the gingival margins may be established.

2. The excessive convergence of the proximal walls and subsequent loss of retention can result. This loss of retention, caused by excessive convergence, is accompanied by a loss of tooth structure in the linguoincisal region and has the effect of shortening the lingual walls of the proximal grooves which will be placed later.

Incorrect angulation of the disk labiolingually results in excessive display of gold and unnecessary loss of labial tooth structure. The common error is insufficient lingual convergence of the disk and cutting almost straight through the contact areas. The labioaxial margins thus lose all natural convexity and are straight and boxlike. The gold casting on such a preparation frames the tooth like a picture and is immediately apparent to any observer (Fig. 2).

It should be mentioned here that the natural convexity of the labial margins of the correctly prepared tooth does not interfere with pattern withdrawal. The pattern draws on the bevels which are formed along the facial aspect of the proximal grooves. The point is, that not

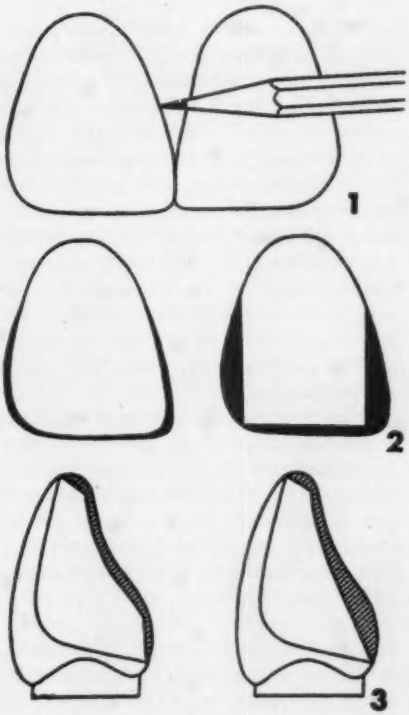
Fig. 1 • Sharp pencil used as guide for labial margins

Fig. 2 • Contrasting results of correct (left) and incorrect (right) lingual convergence of proximal cuts

Fig. 3 • Left: Correct lingual reduction. Right: Incorrect lingual reduction

Fig. 4 • This area of casting from groove to groove around lingual axial wall aids in retention

Fig. 5 • Groove A is longer and has a longer lingual wall than B or C



much of the natural labial shape of the tooth needs to be destroyed.

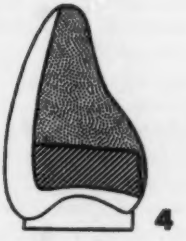
Reduction of Lingual Surfaces • By visualizing the reduction of the lingual surface in two separate steps and using two different stones the operator may overcome the common mistake of cutting away too much of the cingulum area.

The lingual aspect of the cingulum should form an axial wall which is parallel to the long axis of the tooth. This wall is shaped by continuing the lingual extremities of the proximal slices around the cingulum with a small tapered diamond instrument. The stone is kept parallel with the long axis of the tooth. Only enough cutting need be done to establish a finish line in the gingival sulcus and remove any undercuts present in this area (Fig. 3).

The lingual surface extending from the top of the cingulum to the incisal is reduced uniformly with a small wheel stone to a depth that will give the operator 0.5 mm. clearance for metal.

Careful reduction of these two lingual surfaces will help preserve the labiolingual thickness of the tooth and will aid materially in securing proper proximal grooves. Also, the section of metal grasping the tooth from groove to groove around the almost-parallel axial wall of the cingulum augments retention considerably (Fig. 4).

Placement of Proximal Grooves • All efforts should be directed toward making long proximal grooves. Hence they



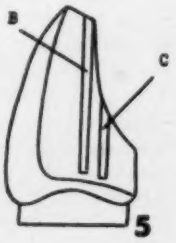
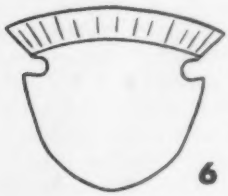
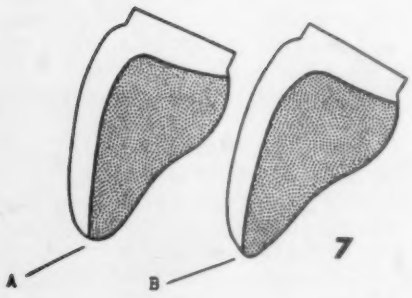
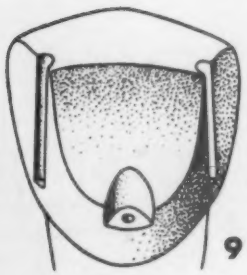


Fig. 6 • Lock effect in proximal grooves
Fig. 7 • A is less conspicuous than B
Fig. 8 • Pin placed low on cingulum does not endanger pulp
Fig. 9 • Seat and cingulum pinhole







should be placed as far labially as is possible without undermining the labial enamel. Also, in the anterior three-quarter crown preparation, placing the grooves parallel to the incisal two thirds of the labial surface results in a longer groove (Fig. 5).

The grooves should converge only slightly toward the incisal edge to afford good frictional retention of the finished casting.

In the average tooth, the groove formed by cutting into the dentin with a no. 700 bur to a depth equal to the full diameter of the bur is sufficient if the groove is refined and enlarged slightly with the corresponding diamond instrument. All dimensions of the lingual wall of the groove should be preserved, except for slight smoothing of the sharp edge. Any modifications which result in shortening the length of the lingual wall of the groove result in decreased retention. If a box modification is necessary, it is good procedure to use an auxiliary method of retention.

After the bevels have been placed along the labial walls of the grooves, a slight re-emphasizing of the grooves results in increased retention. Re-emphasizing the grooves is done by placing the no. 700 bur or diamond stone back in the groove and reforming the depth of the groove slightly (Fig. 6).

Incisal Reduction • Rarely is it necessary to display an unsightly amount of metal along the incisal edge. By beveling the incisal edge toward the lingual at an angle of approximately 45 degrees to the long axis of the tooth, sufficient incisal protection can be gained with only slight reduction of the labioincisal edge.

An incisal groove is very desirable to increase resistance to displacement. If the tooth is sufficiently thick labiolingually, the incisal groove should be placed routinely. The resultant rib of metal strengthens the casting considerably against gingival spreading and, with the metal which engages the proximal

grooves, forms a staple effect for increased resistance.

Judicious shaping of the incisal portion of the gold casting will help to minimize the reflection of metal (Fig. 7).

Auxiliary Devices for Retention and Resistance • Various grooves and pins can be utilized for increased retention and resistance of the anterior three-quarter crown.

One of the most commonly used and most valuable is the incisal groove. Whereas some teeth are so thin labiolingually that the incisal groove should not be used, it is possible for this groove to be placed in the majority of instances. The incisal groove is of no aid if it does not have a definite lingual wall. By starting the groove with a knife-edge stone, or even a no. ½ round bur, and developing the planes carefully with a sharp chisel, one can often form a usable groove on thin teeth. If possible, when cutting the incisal bevel on thin teeth it is better not to bevel the incisal plane to a full 45 degrees. A flatter incisal edge lends itself more readily to the forming of a definite lingual wall for the groove, because more tooth tissue is then available in that region.

Another useful addition is the cingulum pin. A surprising amount of resistance and retention can be safely added by this method. It does not endanger the pulp if the pinhole is placed low on the lingual aspect of the cingulum close to the gingival margin of the preparation. It should not be placed in the middle of the main lingual surface (Fig. 8).

A seat is first established for this pin just above the linguogingival margin of the preparation. A no. 558 bur or a slightly tapered diamond instrument can be used to establish the seat. Care must be taken to insure that the walls which partially surround the seat do not undercut the preparation. The pinhole is placed in the seat, using a no. ½ round bur for easy entry; then, the pinhole is refined with a no. 700 bur, or similar diamond point. The pin must be aligned with the proximal grooves and, if judiciously placed, can safely be made 1.5 mm. long. The pin and the walls of the seat offer a substantial amount of additional retention when restoring a tooth which has a small cingulum or when replacing an old restoration in which the cingulum has been over-reduced (Fig. 9).

The lingual aspect of the preparation between the top of the cingulum and the gingival margin has been discussed previously. This wall is not continuous with the main area of lingual reduction but should be parallel with the proximal grooves. The longer the axial wall of tooth structure is, the more retention it affords. Sometimes, on a tooth having a small cingulum, the axial wall can be lengthened slightly and made more parallel with the proximal grooves by cutting a narrow shoulder to replace the chamfer or featheredge finish at the gingival termination of the preparation. Such a shoulder fades out at the linguoaxial angles of the preparation and is continuous with the gingival finish line on the mesial and distal aspects of the preparation.

The use of these and other modifications which can be employed, plus the attention to detail in the steps of preparation of the anterior three-quarter crown allows this restoration to be utilized satisfactorily in many instances.

SUMMARY

It seems that the use of the three-quarter crown for restoring anterior teeth is being abandoned by a substantial number of dentists, especially since the advent of the high-speed rotary instruments. An attempt has been made to re-emphasize important points in the development of a successful three-quarter crown that may aid the operator in developing more esthetic and more retentive preparations.

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Dental surgery during continuous anticoagulant therapy

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Experience at The New York Hospital indicates that with careful medical management and prescribed surgical technic, dental surgery may be carried out safely while prothrombin times are maintained at therapeutic levels. There was no incidence of unusual hemorrhage during or after dental surgery on 20 patients undergoing anticoagulant therapy.

Dental surgery can be performed safely while patients are maintained on anticoagulant drugs. Twenty patients undergoing prolonged anticoagulant therapy have undergone 45 surgical procedures in the section of oral surgery of The New York Hospital-Cornell University Medical College. There was no incidence of unusual hemorrhage during or after surgery. One patient exhibited some minor postextraction oozing. All extraction wounds were dressed with absorbable gelatin sponges and sutures were placed at the time of surgery. Although these results are at variance with those reported by some,[1-3] they are consistent with those of Askey.[4]

Anticoagulants are now an accepted form of therapy for patients who have suffered from thrombo-embolic diseases such as coronary thrombosis with myocardial infarction, certain types of strokes, venous thrombosis, thrombophlebitis migrans and rheumatic and arteriosclerotic heart disease with embolization. Anticoagulants are administered both as specific treatment for thrombo-embolic manifestations and as a prophylactic measure to prevent recurrence. In the latter instance they are often continued for long periods of time, sometimes for the remainder of the patient's life.

The aim of anticoagulant treatment is to retard or prevent intravascular coagulation. The prothrombin time determination is used as an indicator of the effect of the drugs. Normal prothrombin time, as determined by the Quick test, varies between 10 and 16 seconds. The optimal therapeutic range is between one and one-half and two times the normal for the test being used. For example, with a control test of 15 seconds the therapeutic range should be 22 to 30 seconds. Careful attention must be given to accurate testing of prothrombin levels. The dosage required to maintain the proper level varies between patients and, often, from day to day.[5] Each patient must be managed with attention to such factors as the presence of other pathologic conditions, concurrent administration of other drugs, the prothrombin time on preceding days and response of the patient to the anticoagulant being used. The dosage must be determined by the prescribing physician who should be trained, or experienced, in this exacting form of therapy.

The mode of action, the time to peak effect and the duration of activity varies with the different anticoagulants. The coumarin and phenylindanedione drugs require from one to three days before significant prolongation of prothrombin time is achieved. They inhibit prothrombin synthesis in the liver and also affect the activity of other clotting factors, including Factors VII, IX and X. Their anticoagulant effect persists for one to seven, or even more days after being discontinued. Heparin is primarily antithrombin in nature. Given intravenously, its effect is almost immediate and lasts for one to four hours. Given subcutaneously, the onset of action is 30 to 90 minutes later and may continue for 8 to 12 hours.

Discontinuing long-term anticoagulant therapy with a resulting return of the activity of the clotting factors to normal is accompanied by the risk of serious, or even fatal, thrombosis or emboli. Cosgriff[6] reported that stopping long-term anticoagulant therapy in 17 patients resulted in recurrent embolism in 71 per cent of the group. Facquet and others[7] reported that a patient who had been kept on an anticoagulant regimen for 11 months incurred a fatal cerebral embolism 13 days after the treatment was stopped so dental extractions could be performed. Dental extractions, subsequent to those reported here for which anticoagulants were maintained, were performed on one patient in our series (Case 5). For this second episode of dental extractions, anticoagulants were discontinued and were not reinstituted. Seventeen days later the patient incurred a massive cerebral thrombosis and expired eight days later. Tulloch and Wright[8] reported on the effects of discontinuing anticoagulant drugs in 14 patients (four days in most instances, eight days in one) to permit the prothrombin to return to normal or near normal levels in preparation for extraction of teeth. One of these patients developed serious cerebral and brachial emboli although bishydroxycoumarin (Dicumarol) therapy was resumed on the day of operation. Of this group, one patient was not available for what was then thought to be proper preoperative preparation, that is discontinuation of the drug. His tooth socket oozed blood for three days. However, his prothrombin time was then 51 seconds (control 15.5 seconds). In another patient of this group the details of bishydroxycoumarin dosage and of prothrombin time were not known, but it was recorded that the tooth socket was sutured and that there was no undue bleeding. These were the observations that led to further investigation of this situation.

SURGERY DURING ANTICOAGULANT THERAPY

Because of the possible danger of excessive bleeding, it has usually been the practice to neutralize the effect of prolonged prothrombin activity in preparation for surgical procedures. However, some studies have been reported where surgical procedures have been undertaken successfully without discontinuing anticoagulant therapy.

A study of 60 patients on whom various surgical procedures were performed was reported by Littman and Brodman.[9] The patients were divided into three groups: (1) those who were treated preoperatively with anticoagulants, (2) those who received no anticoagulants and (3) those who received anticoagulants concomitantly with surgery. They found that all patients in the group in which bishydroxycoumarin was not discontinued had uneventful convalescences and that no excessive bleeding occurred. There was no added mortality due to concomitant use of anticoagulant drugs and surgery. They concluded that certain types of surgery, including leg amputation, venous ligation and lumbar sympathectomy, could be performed safely on patients whose prothrombin time is prolonged. Even more

formidable surgery, including mitral commissurotomy and lobectomy, has been carried on by Storm[10] and mitral commissurotomy has been done by Miscall[11] with reduced risk of thrombo-embolism and without undue danger from hemorrhage.

The question as to whether dental surgery should be performed while the patient is maintained on active anticoagulant therapy has been the subject of conflicting reports. Successful maintenance on anticoagulants while performing dental surgery was reported by Askey and Cherry.[4] In their series of six patients, bishydroxycoumarin therapy was not interrupted for dental extraction and no unusual bleeding occurred. As a result, they felt that "discontinuance of Dicumarol prior to dental extraction should not necessarily be routine procedure; in certain persons with demonstrated strong tendency to recurrent thrombosis, Dicumarol should be continued, based on the decision that the danger of clotting without the drug is greater than the danger of bleeding with the drug."

Ziffer, and others[1] and Scopp and Fredrics,[2] however, reported two instances where "dental extraction, performed during the course of protracted Dicumarol therapy, were followed by excessive bleeding." Their reports prompted an editorial in the *New England Journal of Medicine* which states:

> The use of such drugs [anticoagulants] cannot be expected, therefore, to be devoid of hemorrhagic complications or of therapeutic failures. . . . The present article is a useful reminder of the fact that bishydroxycoumarin bleeding can easily be initiated by trauma and that such hemorrhages are not always harmless. One cannot but endorse the authors' conclusions that the drugs should be discontinued during elective surgery.[12]

Our experience has resulted in the conclusion that taken properly, anticoagulants need not be discontinued for appropriate dental surgery, and that indeed such discontinuance may be more dangerous than proper dental surgical technic under therapeutic anticoagulant levels.

Dental surgical procedures were performed at The New York Hospital on 20 unselected patients while they were on an anticoagulant regimen. The procedures consisted of a total of 36 extractions, including three open, or surgical, removals; two operations for removal of masses of chronically inflamed soft tissue; two alveolotomies; one drainage of an abscess; one one-stage root canal filling and apicoectomy of an upper bicuspid; and the insertion of two Behrman magnetic implants.

The diagnosis of vascular diseases requiring anticoagulants in these patients included thrombophlebitis, acute myocardial infarctions, cerebral emboli and thromboses, emboli to other organs, arteriosclerotic heart disease, saddle embolus, and rheumatic heart disease with atrial fibrillation and embolization. These patients were operated on between October 1956 and May 1960. Sixteen were men and four were women. The youngest was aged 43 and the oldest was 78, with an average age for the group of 59.8. The average age for the men patients was 61.1 and for the women it was 54.5. All were private patients except one ambulatory patient who was treated in the dental and oral surgery out-patient clinic. Fifteen were in-patients. Eight of these were admitted specifically for the dental surgical operations. The remaining seven developed incidental dental difficulties during their stay in the hospital. Five were ambulatory dental patients and were treated during the last year of this study.

Each of these patients had been on prolonged anticoagulant therapy. Fourteen of them had been taking bishydroxycoumarin, one had been taking ethyl biscoumacetate (Tromexan), two had been taking warfarin sodium (Coumadin), one had been taking phenprocoumon (Liquamar) and two had been taking a combination of bishydroxycoumarin and ethyl biscoumacetate. The highest pro-

thrombin time recorded on the day of operation for any of these patients (Case 18) was 37.3 seconds (control 16.6), and the lowest (Case 2) was 17.6 seconds (control 14.5 seconds). The prothrombin determinations were by the Link-Shapiro modification of the Quick test using Acuplastin as the thromboplastin. The average prothrombin time for all patients on the day of operation was 25.7 seconds. For 16 procedures the anticoagulant medication was maintained continuously, including the day of operation. For these patients the average prothrombin time on the day of operation was 24.8 seconds. Medication was stopped for one patient (Case 7) one day prior to operation. His prothrombin time on the day of operation was 36.2 seconds (control 14.7 seconds). Anticoagulant was withheld from three other patients (Cases 10, 14 and 18) on the day of surgery only. The average prothrombin time on the day of surgery for these patients was 34.1 seconds. All four patients (Cases 7, 10, 14, and 18) not receiving anticoagulants on the day of surgery had prothrombin times that day averaging 34.6 seconds. This was 9.8 seconds higher than for the group whose therapy was not interrupted and explained the reason for omitting one or two doses. Drugs were reinstituted one or two days after surgery for all patients whose therapy was interrupted. The five ambulatory patients were maintained on anticoagulants continuously. The average prothrombin time on the day of surgery for these patients was 25.9 seconds.

The dental surgical procedures usually consisted of from one to three extractions. One patient had a much more extensive amount of surgery performed at one time. Nine teeth were extracted, a substantial amount of chronic inflammatory tissue was removed and an alveolotomy was performed (Case 11). The open, or surgical, removal of teeth involved reflection of mucoperiosteal flaps and the removal of bone by means of a mallet and chisel. For one patient (Case 12), the removal of a lower left second molar necessitated the removal of a substantial amount of heavy buccal plate, the entire operation taking more than one-half hour. The insertion of the Behrman magnetic implants was done on an ambulatory patient (Case 20) as part of a class demonstration. The operative time was approximately one and one-half hours. None of the procedures was complicated by excessive bleeding during surgery. Two patients (Cases 17 and 20) exhibited more postoperative ecchymosis than might be expected. One patient (Case 8) bled for a few moments when a silk suture was removed. The bleeding was controlled by biting pressure. Only one patient (Case 18) had significant postoperative bleeding. This bleeding began after the removal of an upper left second molar, which had periodontal involvement. There was no gingival tissue about the mesiobuccal or distobuccal roots. The extraction, therefore, left a raw wound surface—the intraradicular tissue—which could not be sutured. This region oozed slightly several times during the next six days. The oozing was controlled each time by having the patient bite on a gauze pack for ten minutes. The prothrombin time the day of extraction was 37.3 seconds. On the sixth postoperative day, the last time there was any oozing, the time was excessive—51.8 seconds. This was considered an irksome, rather than troublesome, complication.

SURGICAL TECHNIC

The patients were usually premedicated with 100 mg. of pentobarbital sodium, which was often supplemented with meperidine, usually 100 mg. Local anesthesia was used in all instances. The anesthesia consisted of 2 per cent lidocaine hydrochloride without a vasoconstrictor except in one instance when 1.5 per cent metabutoxycaine hydrochloride with epinephrine 1:60,000 was used.

In addition to the customary measures

observed in routine dental surgery, the following points were emphasized. For extractions, a sharp blade (no. 12) was used to incise the interdental papillae on either side of the tooth, or teeth, to be removed. The incision was also carried along the gingival crevice down to the bony crest. The blade hugged the tooth and incised the periodontal fibers. Meticulous care was taken not to lacerate or tear the soft tissues during application of the forceps or luxation of the tooth. A 2 by 2 sponge was always in the operator's left hand. Whenever he was not working directly at the operative site, the sponge was placed over the area and pressure was applied by the operator or by having the patient bite the sponge. A piece of absorbable gelatin sponge, approximately 1.5 by 1.0 by 0.5 cm., was crushed into a cone shape and placed in every root socket. A minimum of two sutures—one across each interdental papilla—was used for every extraction wound. Large "bites" of tissue were taken, always separately, through the buccal mucogingiva and then through the palatal or lingual mucogingiva. The sutures were always tied under tension. This is important; the pressure constricts the small blood vessels to aid hemostasis. The tension was maintained for 24 to 28 hours by the slight swelling of the involved tissues. The same principles were employed for all other dental surgery: sharp incisions, careful reflection of tissues, definite cutting of hard and soft tissue, continuous pressure on the area when not working there and the liberal use of sutures under tension. No. 00 black silk sutures were used for the first patients. Because some of these patients seemed unduly apprehensive about the possibility of bleeding during the removal of sutures, no. 00 plain gut was subsequently used.

Postoperative care was as follows: the patients bit on gauze pressure packs for a minimum of one-half hour immediately after surgery. Ice packs were applied externally for 48 hours (one-half hour on, one-half hour off, and so forth). Mouth rinses and hot liquids were withheld for 48 hours. A soft diet was maintained for 48 to 72 hours.

ANTICOAGULANT THERAPY

The technic for anticoagulant therapy is now well established. For the coumarin or phenylindanedione derivatives, the optimal therapeutic range for the prothrombin time is one and one-half to two times that of the normal control using the Quick test or a modification of it (22.5 to 30 seconds with a control of 15, plus or minus 1, seconds). The indications and contraindications have been enumerated in previous communications.[8-10] If the prothrombin time exceeds 35 seconds, no additional anticoagulant is given until it returns below that level. If it reaches 45 to 50 seconds, 5 mg. of vitamin K_1 is given orally, if over 70 seconds, 10 mg. of vitamin K_1 is given. If hemorrhage of major importance develops, additional vitamin K_1, and in rare instances, whole blood transfusions may be used. If bleeding is associated with heparin therapy it usually stops when the clotting time returns to normal, but protamine sulfate may be used if desired. It should be remembered that unexpected bleeding at therapeutic levels may indicate a hidden lesion such as an ulcer, diverticulitis, renal calculus or a malignant growth.

Data on the individual patients are given in Tables 1 and 2.

DISCUSSION

It should not be difficult to understand why dental surgery can be performed during anticoagulant therapy without the danger of excessive bleeding. Littman and Brodman[9] point out that the walls of injured blood vessels collapse and agglutinate. In smaller vessels this agglutination may occlude the vessel adequately and clotting may not be necessary. Where the formation of a clot is necessary to achieve

Table 1 • Prothrombin time and dose

Case no.	Age	Sex	Disease	Anticoagulant	Pre-op 2 days*	Pre-op 1 day*	Op day*	Post-op 1 day*
1	49	F	Phlebitis	Dicumarol	200 mg.	75 mg.	75 mg.	30.7/15.6
2	45	M	Myocardial infarct (old)	Dicumarol	100 mg. 16.0/13.5	75 mg. 16.5	75 mg. 17.6/14.5	75 mg. 19.7/15.0
3	58	M	Phlebitis with emboli	Dicumarol	150 mg. 17.9/15.5	150 mg. 19.9/15.4	100 mg. 18.2/15.0	100 mg. 16.4/14.7
4	69	M	A.S. with myocardial infarct	Dicumarol	75 mg. 23.5/14.1	75 mg. 24.6/14.4	50 mg. 27.2/15.2	50 mg. 30.4/15.2
5	54	M	Acute myocardial infarct	Dicumarol	25 mg.	50 mg. 23.3/13.6	25 mg.	0 29.4/13.3
6	60	F	2 myocardial infarcts (old)	Dicumarol	50 mg. 23.6/17.0	25 mg.	75 mg. 20.6/14.4	50 mg. 23.5/16.3
7	56	M	Recur. phlebitis	Dicumarol	75 mg. 33.8/14.8	0 40.8/15.2	0 36.2/14.7	0 (50 mg.†) 39.6/15.0
8	62	M	Multiple emboli	Dicumarol Tromexan	300 mg.	300 mg.	300 mg. 22.0/14.2	300 mg.
9	71	M	Myocardial infarct	Dicumarol Tromexan	75 mg. 300 mg.	75 mg. 19.5/16.8	75 mg. 300 mg. 19.0/16.7	75 mg. 19.0/17.8
10	67	M	A.S.O., gangrene, 2 myocardial infarcts	Dicumarol	75 mg. 28.5/17.9	75 mg.+ Vit. K (5 mg.) 33.4/17.8	0 30.1/16.6	75 mg.
11	61	M	2 Myocardial infarcts (old)	Dicumarol	50 mg.	50 mg.	50 mg. 17.9	100 mg. 17.0/15.4
12	59	M	1945: myocardial infarct 1958: 2 strokes plus phlebitis	Dicumarol (9 months)	37.5 mg.	37.5 mg.	37.5 mg. 22.7/17.8	25 mg. 21.5/16.2
13	43	M	Coronary insufficiency	Dicumarol	50 mg.	50 mg. 24.8/13.5	50 mg. 24.8/13.5	50 mg.
14	63	M	Myocardial infarct Cerebral embolus	Coumadin	2.5 mg. 30.0/16.2	2.5 mg. 23.3/15.8	0 35.0/15.8	2.5 mg.†
15	60	M	Myocardial infarct	Dicumarol	25 mg.	25 mg.	25 mg. 27.0/14.0	25 mg.
16	78	M	A.S.H.D.	Liquamar	1.5 mg.	3 mg. 22.3/17.2	1.5 mg. 19.3/14.0	1.5 mg. 22.4/15.6
17	51	F	R.H.D. with saddle embolus	Coumadin	0	5 mg. 36.0	2.5 mg. 34.9/14.0	7.5 mg. 26.9/15.0
18	76	M	A.S.O. and myocardial infarct	Dicumarol	75 mg. 18.5/13.4	75 mg. 30.0/14.4	0 37.3/16.6	0 (200 mg.†) 34.6/15.2
19	58	F	Phlebitis	Dicumarol	75 mg. 23.7/14.0	0	75 mg. 26.0/13.0	75 mg.
20	55	M	Myocardial infarct	Dicumarol	50 mg.	50 mg.	100 mg. 22.7/13.0	100 mg.

A.S.O.—Atherosclerosis obliterans. A.S.H.D.—Atherosclerotic heart disease. R.H.D.—Rheumatic heart disease. *—Prothrombin time given in seconds. †—Post-op 2 days.

Table 2 • Operation and comment

Case no.	Adm. status	Dental operation	Other medications	Comments
1	D	Upper second molar (non-vital, periodontal infection)	Penicillin, 300,000 B.I.D. Tetracycline, 250 mg., 4 I.D. Pentobarbital sod., 150 mg.	No bleeding problem. Minimal swelling
2	D	Upper central, lateral, cuspid, bicuspid, molar. Alveolotomy	Penicillin, 300,000 B.I.D. Meperidine, 100 mg. Pentobarbital sod., 100 mg.	No bleeding problem. No swelling
3	M	Upper first molar (non-vital, periapical abscess)	Meperidine, 100 mg.	No bleeding problem
4	M	Lower second molar. Large mass chronic inflamed tissue removed	Tetracycline, 250 mg., 4 I.D. Pentobarbital sod., 100 mg.	No bleeding problem
5	M	Upper central, lateral, cuspid	Tetracycline, 250 mg., 4 I.D. Pentobarbital sod., 100 mg. Meperidine, 100 mg.	No bleeding problem (see text re: sequela to a subsequent dental procedure)
6	M	Root fragment—upper first bicuspid—surgical removal	Meperidine, 150 mg. Pentobarbital sod., 100 mg.	More than average bleeding at operation, readily controlled with absorbable gelatin sponge
7	M	Upper second molar (periodontal)	Penicillin, 300,000 B.I.D. Meperidine, 100 mg. Pentobarbital sod., 200 mg.	No bleeding problem
8	D	Apicoectomy & root canal filling—upper left first bicuspid	Penicillin, 400,000, B.I.D. Dihydrostreptomycin, 0.5 gm. Meperidine, 100 mg. Pentobarbital sod., 200 mg.	No bleeding problem. Infraorbital ecchymosis. Slight oozing on silk suture removal, controlled easily with pressure
9	D	Upper first bicuspid, surgical removal	Meperidine, 100 mg. Pentobarbital sod., 300 mg.	Slight oozing at operation. Easy hemostasis
10	M	Upper cuspid 5 mm. periapical cyst	Meperidine, 100 mg. Pentobarbital sod., 100 mg. Vitamin K_1, 10 mg.	No bleeding problem
11	D	Upper 6 anteriors, 2 second molars, first bicuspid root. Large amount inflamed tissue removed. Alveolotomy	Tetracycline, 250 mg., 4 I.D. Meperidine, 100 mg. Pentobarbital sod., 150 mg.	No bleeding problem
12	D	Lower second molar, surgical removal	Tetracycline, 250 mg., 6 I.D.	No bleeding problem
13	A	Lower second molar	Meperidine, 100 mg. Pentobarbital sod., 100 mg.	No bleeding problem
14	M	Upper second molar (periodontal)	Meperidine, 100 mg. Pentobarbital sod., 100 mg.	No bleeding problem

15	A	Lower cuspid (periodontal)	Meperidine, 100 mg. Pentobarbital sod., 100 mg.	No bleeding problem
16	A	Lower central, lateral cuspid	No pre-medication	No bleeding problem
17	D	Upper first & second molars, drainage of fluctuant palatal abscess. Upper third molar, chronic inflamed tissue removed	Penicillin, 600,000 I.D.	Moderate edema of cheek. Very slight oozing and ecchymosis
18	D	Oral moniliasis, upper first molar. No buccal sockets. Intraradicular bone granulations. No buccal gingival tissue to suture. Gelatin sponge in palatal socket	Nystatin Pentobarbital sod., 100 mg Aspirin	3 days postextraction, slight oozing, controlled with pressure. Fourth day patient injured wound with denture clasp, clots of fresh blood controlled with pressure
19	A	Lower first bicuspid	Pentobarbital sod., 100 mg. Aspirin	No bleeding problem
20	A	Insertion of 2 Behrman magnetic implants to aid dental retention	Pentobarbital sod., 100 mg. Meperidine, 100 mg.	No bleeding problem. Slight ecchymosis

A—Ambulatory, out patient.
D—Admission for dental surgery.
M—Admission for medical care.

hemostasis this clot must be tough and tenacious. Since normal clotting time is between 30 to 120 seconds, there must be sufficient slowing of blood flow to permit the massing of a platelet plug and subsequent intravascular activity to build a clot. Were the blood flow not slowed down, it would repeatedly wash the initial efflux out of the mouth of the vessel. With the patient on anticoagulants and the clotting time prolonged, the blood flow must be slowed adequately to permit the delayed mechanism to form a clot. In routine dental surgery large vessels are rarely encountered or injured. The vessels which are opened are either small enough for the agglutination of the walls to provide hemostasis, or of such size that blood flow can be slowed sufficiently by external pressure to permit the formation of a tough tenacious clot. Problems are encountered when a large raw surface must be left exposed. Here it is not a question of intravascular clotting, but rather the oozing of blood elements through the exposed wound surface.

Four steps to encourage local clotting are taken as part of the surgical technic: (1) pressure is applied constantly to the involved tissues even when, for example, a tooth is being luxated, (2) absorbable gelatin is placed in each socket to help serve as a matrix for clot formation, (3) multiple sutures are placed under tension and (4) heavy biting pressure is applied immediately postoperatively. After surgery cold applications are employed. Measures are taken not to disturb the clots which have formed. No mouth rinses are permitted, hot liquids are avoided, and a soft diet is maintained. Because the tissues are sutured tightly, postoperative edema increases local tissue tension and pressure on the vessels. It may be surmised also that the injured tissues, and the tissues under pressure, liberate thromboplastin which aids in local clotting.

The placing of sutures at the time of surgery is important; they coapt the soft

tissues as much as possible, decrease the aperture of the extraction wound and apply tension to slow the blood flow. When possible, large raw surfaces should not be left exposed. Without sutures, poor clot formation creates an oozing gelatinous mass which increases in size and spreads the soft tissues apart. This exposes more oozing surface, engorges the tissues and makes them friable. Sutures placed during an episode of postoperative hemorrhage are never as valuable as those which should have been placed when the surgery was performed.

The results in this series of 20 patients differ considerably from those of the two patients reported by Ziffer and others[1] and by Scopp and Fredrics,[2] who reported severe hemorrhage after the removal of individual teeth. In their first case of massive facial hematoma after the removal of an upper left third molar, it might be surmised that there was injury to the vessels in the pterygoid plexus. A lower first molar was easily removed from the second patient, but an absorbable gelatin sponge was not placed in the wound nor were sutures placed initially. There was profuse postextraction hemorrhage. A lower first bicuspid was later removed from this same patient without difficulty; absorbable gelatin sponges and sutures were placed after the operation. Yet, on the first and second postoperative days there was profuse hemorrhage. The prothrombin time was 29 seconds. In the present study, a total of seven teeth were removed from five patients while their prothrombin times were higher than that (between 30.7 and 37.3 seconds). None experienced any hemorrhage. Only one had periodic episodes of slight oozing from a raw area that could not be sutured.

SUMMARY

Reports of others[1,2] based on findings with two patients appear to have been unduly alarming. Experience at The New York Hospital indicates that with careful medical management and prescribed surgical technic, dental surgery may be carried out safely while prothrombin times are maintained at therapeutic levels.

Since the completion of this study more than 20 additional patients have had dental surgery by dental surgeons using similar technics and have had no problems related to hemorrhage.

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Intramural (private) practice: its impact on dental education and the profession

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For eight years, the intramural (private dental practice) program at the School of Dentistry, University of North Carolina, has served to attract and to retain qualified, full-time faculty members. The combined net income of the staff member cannot exceed an amount equal to twice his annual base salary, and in any case cannot exceed $30,000. A maximum of 10 hours during a 44-hour academic week may be devoted to intramural practice. Advantages and disadvantages of the program are discussed.

Perhaps one of the most challenging questions which could be directed to the dental profession, and to all of those interested in dental education, relates to professional standards and involves the following critical point: How often is dental education being forced to compromise by the appointment of available dentists to the faculty?

The following questions are significant and common in the lives of many practitioners, part-time and full-time teachers and administrators who have the responsibility for the selection, development and maintenance of a faculty. How much opportunity, in general, does dental education have to select or screen a potential member for the faculty from a list of candidates who possess the desired and recognized knowledge and skills and have demonstrated leadership through creative thinking and research? To what degree is mediocrity being fostered or perpetuated in the profession by faculty members who are not qualified to teach, or whose major interest is in areas outside of dental education? Can dental education obtain and then retain the services of the most promising young graduate, who potentially may develop into a fine or great teacher when he has realized added years of experience, maturity, knowledge and skills, with the average salary now available? What incentive is there for a young dentist to pursue further education and training on a graduate level in the basic or clinical sciences or in education for a career in teaching?

Fortunately for the public, the profession and dental education, there has been in the past an appreciable number of dedicated individuals who were great teachers and gave service above self. This is true today. In every institution there generally are a number of excellent teachers who are making a great contribution to dentistry and who elect to remain in dental education on a part-time or full-time basis at a distinct sacrifice to themselves and their families. The profession owes much to these dedicated teachers of yesterday and today. However, this noble sacrifice on the part of a limited and inadequate number of highly qualified teachers does not solve the major problem now confronting dental education and, accordingly, the dental profession. There is a continuing and mounting diffi-

culty in the procurement of an adequate number of full-time qualified faculty. Although acceptable buildings and equipment are necessary in the conduct of an educational program, mortar, bricks and equipment, or a well designed curriculum on paper cannot produce a dental practitioner.

It is recognized and acknowledged by many that dental education and, therefore, the profession, have a sizable acute problem which involves the health and welfare of the public. For example, the Fund for Dental Education, sponsored by the American Association of Dental Schools and endorsed by the American Dental Association and others, has on its Board of Trustees six deans of schools of dentistry as well as other representatives interested in dental education. It is significant that the initial publication of the Fund (1959) identified the following two major problems and questions and proceeded with a brief discussion of each:[1]

1. What is the crux of the problem? The fact that present faculty salaries are too low in comparison with the average return from private practice. While salary is by no means the only inducement to a teaching career, the prospect of a lower income does deter many fine potential teachers from entering this field. Allied to the salary problem is the need for improvement in the retirement programs of dental teachers.

2. How serious is this problem? Very! Right now there are many departments in dental schools which are seriously understaffed, and there are schools whose very future is uncertain because of their financial inability to attract sufficient full-time teachers.

The latter statement was quoted again in the American Dental Association *News Letter,* July 1959 to indicate the seriousness of the situation.

Perhaps many in the profession may think that this immediate problem belongs to those individuals and institutions associated with dental education, and that it is possible to divorce themselves from this consideration. This is hiding from reality, since the stature and future of the profession directly involve every practicing dentist. The professional services available to the public are a mirror of the level of dental education, and they can be no better than the standards and leadership of the faculty. Accordingly, the Fund for Dental Education and the attending problems in dental education warrant serious attention and the liberal support of every dentist.

One of the possible keys to the solution of an appreciable number of problems in dental education lies in the advantages which may be realized through an intramural private practice program. However, prior to a discussion of this potential, it is deemed desirable to identify further some specific problems related to manpower shortage and dental education and to examine the experience medical education has had with intramural private practice programs.

MANPOWER SHORTAGE RELATED TO DENTAL EDUCATION

Considering that the schools now in existence are experiencing great difficulty in procuring and then retaining a qualified faculty on a full-time basis, it is evident that any new schools to be activated will find this a major problem. Opinions vary greatly as to the degree to which the dental schools presently in operation have had to compromise, since the standards, experiences, educational backgrounds and environments of dental deans, dental teachers, university administrators, dental practitioners and lay educational leaders differ. It is evident, too, that local conditions, commitments and financial resources will have a profound influence on any opinion expressed. Accordingly, the answers to questions which are fundamental to an evaluation of educational standards such as: the desired or optimum faculty:student ratios, the percentage of full-time teachers required, the educational and professional background essential for teaching in dentistry and the time to be allowed for research or other pro-

fessional pursuits, will vary considerably. This wide range in differences of opinion and dental educational programs is to be expected, and it clearly reflects the many problems in dental education.

It must be emphasized that great faculties, which work together as an organized team and exemplify creative and inspirational leadership, cannot be built overnight, and they cannot be bought. Faculties, which reflect continuity in teaching and research and provide professional leadership in education and practice must mature together over a period of years. Therefore, a high percentage of part-time faculty, coupled with a short tenure of service of would-be full-time personnel, presents many educational problems and hazards.

Unfortunately, few dental schools have a budget adequate enough to employ many full-time teachers. To make things more difficult, or impossible, less than 10 per cent of the schools have salary schedules that permit any realistic competition with private practice.

Medicine and medical education have for years recognized the untenable position of most medical schools in attempting to procure and retain a well qualified clinical faculty with the average university salary available. The House of Delegates of the American Medical Association gave official cognizance and consideration to private practice by medical school faculty members in the adoption of the Report of the Council on Medical Service in 1956.[2] This report stated in part:

> It is evident from all facts and data available to the Council that most, if not all, medical schools, permit the so-called full-time faculty members to engage in private practice.

There are many different plans for private practice in medical schools throughout the country, as reported at the symposium on the compensation of faculties of clinical departments at the 66th annual meeting of the Association of American Medical Colleges in 1955. Some of these programs have been operated successfully, and to the advantage of their universities, for more than 25 years.[3]

INTRAMURAL PROGRAM: UNIVERSITY OF NORTH CAROLINA

The program of intramural practice was approved by the University administration in February 1951. The first patient was seen in October 1952.

Aims and Purposes of Program • The primary aims and purposes of the intramural program may be listed as follows:

1. To attract the best qualified young graduates and the more mature recognized practitioners or teachers to a career in teaching or research by permissive salary supplementation via limited private practice in facilities provided by the University.
2. To realize a long tenure of service on the part of the faculty members, thereby permitting continuity and maturation as a teacher for the best interests of the students, the faculty, the university and the profession.
3. To realize a high percentage of full-time faculty members for greater teaching and research economy and productivity.
4. To give additional stature to the full-time faculty members, who can demonstrate without question to the student and to the profession that "he can practice dentistry in reality" as well as "talk a good game."

With reference to this latter point, one of the reasons frequently cited by deans and others for the employment of a part-time faculty is to give the student some contact with "the man in practice."

Another expression which is heard commonly at meetings, "that's fine for teaching and theory, but from a practical point of view. . . ." It is easy to lose the practitioner's point of view and the range of private patient reactions when one avoids the problems of private practice or

does not have the opportunity to pursue the day to day realities. There are many significant differences between student clinical demonstrations with patients and the factors and elements which permit a successful private practice. Accordingly, the teacher who is identified with a private practice has a distinct advantage.

5. To retain and to build a "sense of confidence" and a "sense of professional security" in the mind of the faculty member.

This is an extremely important point, which helps build professional stature and confidence which many times is lost by the full-time teachers who have had no contact with private practice for several years. This confidence is expressed in many ways, such as their discussion of patient problems with students and patients, the type of lectures and clinical demonstrations given to students as well as dental societies, their vital and keen interest in discussions and planning to make teaching or teaching and research a career, and finally the kind of homes they purchase which reflects a permanency, family interests and faculty unity of purpose.

Important, too, is the fact that the student and the professional colleague in practice feel this "sense of confidence" on the part of the faculty member. This factor, as well as the point cited in item 4, also has had favorable overtones in the successful conduct of graduate as well as postgraduate or refresher courses. There are tangible and significant values accrued to the faculty, which are clearly evident from the experiences in private practice, which no amount of money for salaries can buy or realize. This experience must be gained currently, to be interesting and valuable, and to permit the desired motivation of the student, the man in practice and the faculty member.

6. To provide a source of demonstration teaching material, whereby the faculty member can present the patient, the case history and other considerations to the student for evaluation and discussion.

This item has proved to be a valuable source of teaching material. It represents the faculty member's approach to private practice. One can recognize readily that this procedure places the faculty member "on the spot" at all times, not only with the students but with other members of the faculty. Accordingly, there is a high degree of motivation on the part of the faculty member to excel in every service and operation performed.

University Plan and Policy of Operation • The policies for the conduct of intramural service by the full-time faculty of the School of Dentistry are well defined. They are presented here in part.[4]

Who May Become Private Patients

1. Any individual, who is not obligated to another dentist, may become a private patient.

2. A patient is ineligible for private consultation or treatment if he or she has been registered for an examination or treatment in the dental clinic of the School of Dentistry at any time during the past twelve months, unless the patient subsequently has been referred by a dentist or physician outside the School of Dentistry.

Fees and Collection of Fees

1. The member of the staff rendering the service will arrange his own schedule with the patient.

2. All fees collected in the intramural program of the School of Dentistry will be paid into a special fund as established by the University Business Office. All operational expenses, and supplemental payments to the faculty participants, of the intramural program will be paid from this found upon appropriate requisition.

Limitation of Income from Intra- and Extramural Work as a Full-Time Member of the Staff.

A. The combined net income (including regular salary received from the University) and from intramural and

extramural services, shall not exceed an amount equal to twice the annual base salary of the individual staff member, and shall not in any case exceed $30,000.

B. When the combined net income from all sources reaches a sum equal to that cited in A for the year, the remaining net (excess) sum will be deposited in a special dental fund supervised by the Board of Trustees of the University of North Carolina. The monies in this fund may be drawn upon by the School of Dentistry for purposes of research or additional equipment, in accordance with the policies of the University pertaining to such funds.

Common Overhead and Cost Accounting • The University, in accordance with an agreed upon cost formula per square foot of space, receives a monthly rental. The rental, plus the cost of certain clerks, assistants, dental hygienists, part-time manager, part-time supervisor (assistant dean), services of faculty personnel of the department of oral diagnosis and treatment planning and some items of equipment and supply are designated as common overhead. The cost of the common overhead is divided proportionately by the participants. Each participant pays his own costs for a dental assistant, supplies, special equipment, laboratory fees and other expenses. All expenses are deducted from the doctor's income account. The remaining balance represents the net income for a particular month. After an appropriate requisition, the doctor receives a separate check, in addition to his regular salary check, from the University Cashier's office.

Patient Management • Each participant in the intramural program, that is each faculty member, limits his practice in accordance with the departmental designation. For example, the crown and bridge departmental personnel limit their practice to this field, with well defined limitations as to the scope of treatment which have been agreed upon by all participants.

A patient who is referred by a nonparticipating dentist to a specific practitioner in the intramural program, such as the periodontist, will receive only periodontal treatment. He then is sent back to the referring dentist. However, if a new patient is referred by another patient or a physician, a faculty member of the department of oral diagnosis and treatment planning examines and evaluates the patient and requests consultation from the various departmental personnel potentially interested in the patient's need for dental service. Each interested consultant presents his plan of treatment with an estimated fee. The participant from oral diagnosis then presents the complete plan of treatment to the patient, and makes appropriate financial arrangements for payment with the patient. The doctor receives no direct payment from the patient. All money is channeled through the intramural cashier's office, then forwarded to the university treasurer's office.

The success of this plan of operation can be told only by the patients and by the enthusiastic endorsement of the entire faculty. Interesting, too, is the roster of patients, which includes references from former patients, dentists, and physicians from the Midwest and from New England to Florida.

Supplemental Income of Faculty • Whereas not all of the participants have realized their maximum potential for supplementation, the additional net income has in all instances been meaningful and a rewarding experience in many ways. Some participants devote only a part of their allowable time to this activity, and they prefer to direct their remaining reserved time to other personal interests.

ADVANTAGES AND DISADVANTAGES

The principal aims and purposes of the program have been identified and briefly

discussed, and some of the advantages have been presented. Assuming that some other dental schools may find it desirable, or perhaps necessary, to consider a program of intramural private practice, it is evident that such plans will vary considerably.

Advantages of Intramural Program • Whereas a few members of the full-time dental faculty have resigned for miscellaneous reasons, particularly in the earlier phase of the program, a critical evaluation of the faculty roster with reference to tenure of service would be meaningful.

An interesting development is the fact that three members of the faculty have pursued graduate work for their master's degree in other universities, two former members of the faculty now are taking graduate work in other schools and there is a commitment for their return to teach at this school, two members of the faculty completed their graduate work at this University, and currently two faculty members are registered for graduate work on a part-time basis in another university. This motivation to do graduate work is significant.

Another observation relates to the fact that each operator in the intramural private practice tries to render the finest possible service diagnostically and clinically, since his colleagues on the faculty and in private practice outside of the school will have the opportunity to evaluate the services accomplished. Interesting and important, too, is the frequent consultation with his colleagues, that is the oral pathologist, the periodontist, the orthodontist and others. Each participant, therefore, has the opportunity to grow professionally in such an environment, since he continually is motivated and expected to excel in his particular field.

Although not all members of the full-time staff are obligated to pursue a program of research, the faculty in general in a true university discipline is committed to extend the frontiers of knowledge. This philosophy cannot be avoided. The lack of research interests and productivity on the part of the average faculty member clearly represents one of the major "weak-spots" in dental education. The intramural plan can be designed to assist in achieving a continuous and progressive pattern of research.

Another aspect to the plan relates to the necessity for an interest in practice administration on the part of the participant. This current practical experience has many favorable and valuable overtones in the classroom, laboratory and clinic.

Whereas there are other fine programs or experiences which motivate qualified graduates in dentistry to a career in teaching and will provide the desire for advanced study and research, the results achieved in the recommended pattern of intramural private practice are measurable, realistic and significant. The accomplishments are no longer in the realm of theory or wishful thinking.

Disadvantages of Intramural Program • The program places an additional area of responsibility on the dean. He is the one who provides the leadership and is required to make certain basic decisions. This type of operation cannot be successful without well defined, positive rules and policies, which are formally written and agreed upon by the participants, regarding such items as: faculty schedules, patient management, auxiliary personnel and records. This disadvantage, if it may be considered such, can be erased in a large measure by the delegation of responsibility, after the pattern of operation has been established.

The intramural program also requires additional space in the dental building or adjacent area for a number of operating rooms, laboratory and other facilities. If space is a problem in the present dental building, there must be a compromise with other activities or programs. This

question should be asked: what activities in the school requiring space are essential to the central or basic reason for the existence of the school? A school cannot assume the responsibilities inherent in dental education without an adequate number of well qualified teachers. Accordingly, if the salaries and other values which are available do not attract the desired teaching talent, the decision on the part of the university and the dental school administration and faculty becomes fundamental; namely, how essential are qualified teachers?

Some universities and schools may find it to their disadvantage, within their present operational philosophy, to define full-time as it might apply to a program of intramural practice. The North Carolina plan provides for a maximum of ten hours during any one academic week (except for vacations and with no evening practice) which may be devoted to intramural practice. A total of 34 working hours remains. It is within the framework of this 34 hours that a schedule of clinical, laboratory and lecture assignments for each member of the faculty must be made. Furthermore, it is within this 34 hours that time must be provided for the preparation of teaching material, research, committee assignments, student counseling and other academic pursuits. Considering all of the scheduling needs, there remains in the background the all important factor of adequate staff:student ratios to be realized at all times in the clinical areas and laboratories. One cannot compromise under any circumstances with the quality or quantity of instruction. Accordingly, the ratio of full-time teachers may be higher in a program permitting intramural practice than normally provided in a given institution, depending upon the basic philosophy of operation and the interpretation of what constitutes full-time.

The afore-mentioned disadvantages are indeed minor when the advantages are evaluated critically. There are additional problems in the activation and the operation of an intramural program, but the rewards for their solution are significant.

SUMMARY

1. Considering the acknowledged shortage of dental teachers, the question is asked, how often is dental education being forced to compromise by the appointment of available dentists to the faculty?

2. There is common agreement that there now is a serious shortage of dental manpower, an inadequate number of dental schools, and that the population in the United States is growing at a rate to make the dentist:population ratio less favorable each succeeding year.

3. Only a few dental schools have salary schedules which are competitive to private practice, and there is great difficulty in attracting qualified dentists to a career in teaching and research.

4. Medicine and medical education have for years recognized the untenable position of most medical schools in attempting to procure and retain a well qualified clinical faculty with the average university salary available. Accordingly, most, if not all, medical schools permit the so-called full-time faculty members to engage in private practice and realize a supplemental income.

5. The intramural (private dental practice) program at the University of North Carolina, activated some eight years ago, is presented as a positive way to attract and to retain a qualified faculty. The advantages as well as disadvantages of the program are discussed.

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Direct black and white prints for publication from color slides and roentgenograms

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With the aid of a Polaroid camera, the clinician can convert color slides to black and white prints. Three methods for doing this are described.

The clinician, whether he takes his own photographs or utilizes the services of a medical photographer, often desires color slides of patients, specimens or microscopic slides. These are taken for purposes of records and for case presentations. Frequently, later, when the patient or specimen is unavailable for further photography, the clinician decides to publish the case report in the literature and the need to convert color transparencies to black and white prints arises. This requires the costly, complicated procedure of producing a black and white negative from which a print can be made.[1,2] The services of a professional photographer are often needed.

It is possible for the clinician, without utilizing the services of a professional photographer, to convert the slides himself. There are three simple methods of converting slides to black and white prints by using a Polaroid camera.

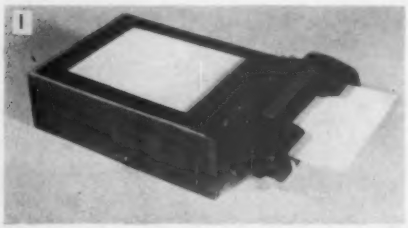

Fig. 1 • The Polaroid 4 by 5 film holder on adapter used to raise it high enough to clear the load-develop mechanism and allow the holder to lie flat. A thin cardboard is placed in it for focusing the image

POLAROID FILM PACK ADAPTER

Since the load-develop mechanism extends downward from the holder, the only modification of the pack adapter necessary for copying is a block of wood 1½ inches by 3¾ inches by 7 inches. This raises the camera high enough to clear the load-develop mechanism, and allows the film in the holder to lie parallel to the slide. If the film is not parallel to the slide, part of the print will be in focus, and the rest out of focus. A frame of ¼ inch or ⅛ inch plywood is placed around this block to keep the holder from moving (Fig. 1). The enlarger easel is used to hold the frame in the proper position and the Polaroid film pack adapter is centered under an enlarger with a 150-watt lamp. The image is focused on a white cardboard placed in the holder instead of the film. The enlarger is turned off and a sheet of film is inserted in the holder, replacing the focusing cardboard. The enlarger diaphragm is closed down to f/32 so the exposure time can be kept

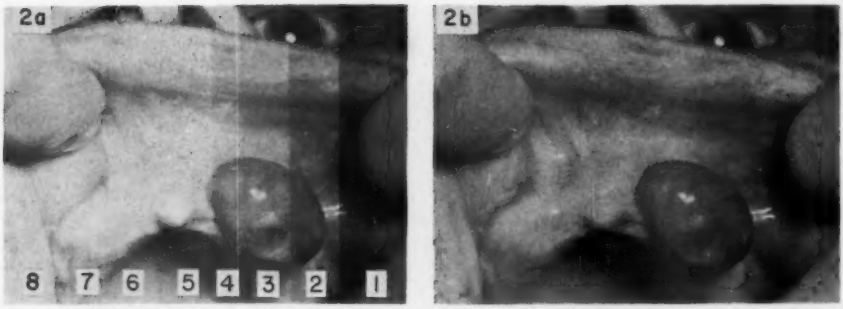

Fig. 2 • A: Test strip print on Polaroid no. 52 film. The correct exposure is strip 3 or one and one-half seconds at f/32. B: A print made at f/32 for one and one-half seconds

in the region of seconds and controlled by an enlarger timer. The dark slide covering the film is withdrawn and the exposure is made.

To find the correct exposure for an average slide, a piece of cardboard 3½ inches wide is placed in the opening of the film holder with the film in position. About ½ inch of the film is allowed to show. A one-half second exposure is made, then the cardboard is drawn out another ½ inch, allowing 1 inch of film to show, and another one-half second exposure is made. This procedure is continued until the entire film has been exposed. After development, the resultant print will have successively lighter strips of exposure ranging from one-half second to four seconds, in one-half second steps (Fig. 2, A). When exposing direct positive material (that is, Polaroid and Kodachrome films) the longer the exposure time is, the lighter the resultant print or transparency will be. A negative is produced but it exists for only a short time during the processing, and is not a permanent record as in standard black and white photography. Overexposure will turn this negative black, and there will be little or no transfer of image to the final print (or transparency). Underexposure produces a light negative and a dark print. In color transparency films this negative is bleached away in the

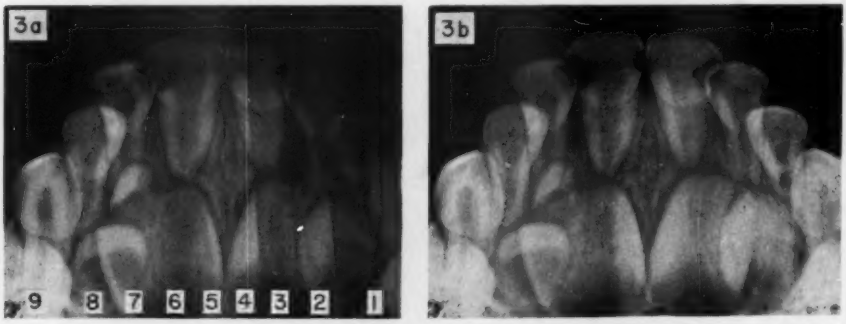

Fig. 3 • A: Roentgenographic test strip print. The correct exposure is strip 9 or four and one-half seconds at f/22. B: Roentgenographic print made at f/22 for four and one-half seconds

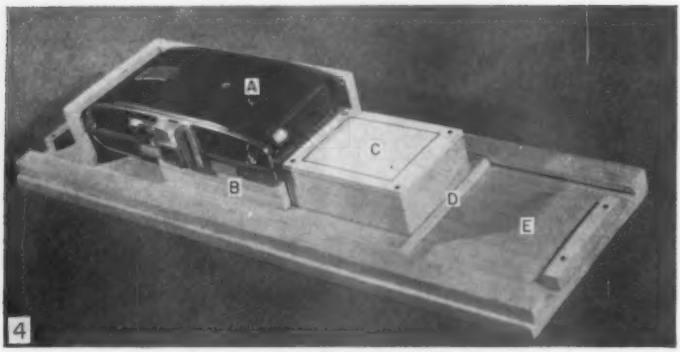

Fig. 4 • Focusing adapter for use with the Polaroid 95 or Graflex Polaroid Back. A: Polaroid camera with the front end up, B: blocks raising camera to keep it level for exposure, C: focusing panel with picture area outlined, D: right end of slider carrying items A, B, and C, and E: dovetail base for the entire copier

final processing steps, whereas with Polaroid film the negative remains an unusable piece of paper after the print is removed.

To increase the contrast of the final print, the development time should be increased from one minute to three minutes. The proper exposure can then be chosen (in this instance, it is band 3 or one and one-half seconds at f/32). When the optimal exposure for an average transparency is known, the exposure is made for the finished print (Fig. 2, B). The exposure time may be increased one-half to two seconds for duplication of slides of more than average density, and reduced one-half to two seconds when reproducing lighter slides.

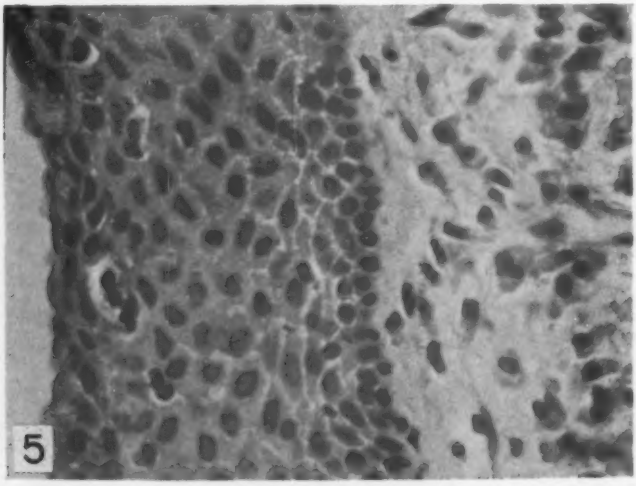

Fig. 5 • Print made using the Polaroid body and focusing adapter

Most roentgenograms have a much heavier film base than color film. This base is usually tinged with blue or grey. In addition, roentgenographic film is coated with silver on both surfaces. These factors tend to increase the picture density to a greater extent than is found in color film. A separate test print should be made to standardize roentgenograms in the same manner as color transparencies. To facilitate the handling of periapical films in the enlarger, it is advisable to use mounts with an opening larger than the standard 35 mm. size (bantam size mounts or periapical film holders cut to 2 inches by 2 inches), which allow more of the film to project through.

To make the test print, the enlarging lens diaphragm should be opened at least one full stop more than for color slides (f/22). Figure 3 demonstrates the need for increased exposure for the aver-

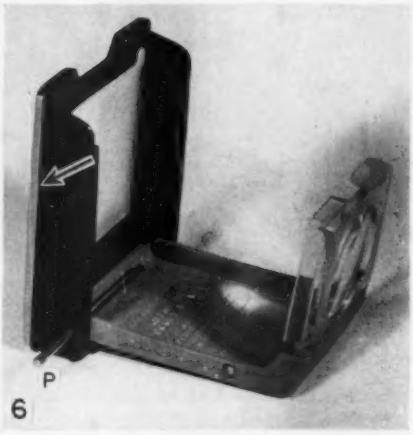

Fig. 6 • Kodak pocket viewer with pin (P) partially removed. The lip, which has been painted with a contrast color for this illustration, is identified by the arrow

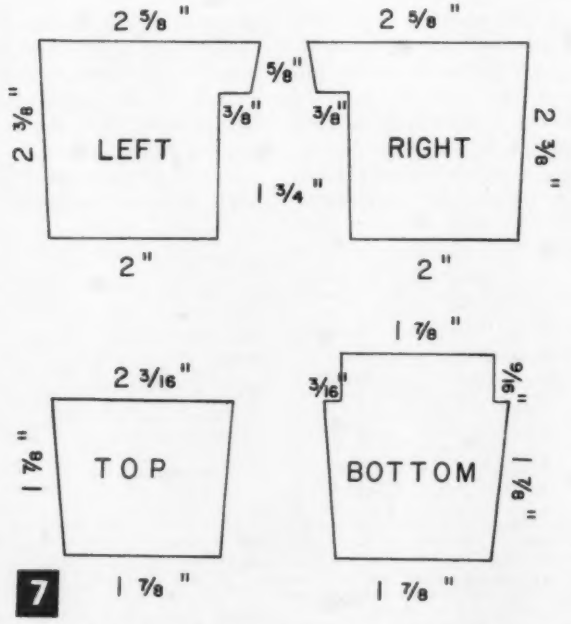

Fig. 7 • Dimensions of the panels for making the close-up copier

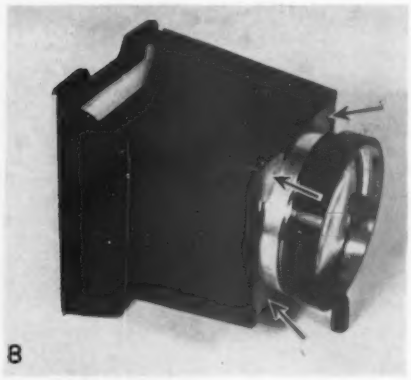

Fig. 8 • Copier with close-up lenses and transparency holder. The arrows point to the self-curing acrylic resin used to hold the retaining ring in the exact position needed

age roentgenogram, which is band 9 or four and one-half seconds at f/22. If only one print is desired, type 52 film is used. When more than one print is desired, type 53 film may be used. This film, when reprocessed according to the instructions given in the Polaroid data sheet packaged with the film, produces both a print and a permanent reusable negative. Other prints can be made from this negative, or made directly on Polaroid film by the method described earlier.

POLAROID CAMERA BODY OR GRAPHIC POLAROID BACK

A Polaroid camera of the 95 series can be purchased either new or secondhand, at a moderate price, usually $20 to $30. The lensboard and bellows are removed. Only the body is used as a film holder. A focusing adapter (Fig. 4) has as its essential parts (A) the Polaroid camera body or Graflex Polaroid Back mounted on a sliding platform (D). Since the back of the camera is not flat, it is elevated by a block of wood (B) so the film plane is maintained parallel to the plane of exposure. A focusing panel (C) consists of a wooden block with an area outlined equivalent to that of the anticipated print. E is the base on which the sliding platform is mounted. Stops at either end of the base alternately bring the camera and the focusing panel into position under the enlarger.

Before the camera is placed in the holder, the carrying strap and strap fasteners should be removed from it.

The slide in the enlarger is focused on the focusing panel, with the desired portion of the slide centered within the picture border. The diaphragm is closed down and the camera is shifted into position by moving the sliding rack to the right as far as it can go. The exposure,

Table • Exposure guide with Pola Pan 200 film

Transparency	Illuminant		
	Flashbulbs*	Floodlights†	Electronic flash‡
Color	f/45 @ 1/125 or no. 17§	f/45 @ 1/60 or no. 17‖	———
Roentgenogram	f/32 @ 1/125 or no. 17¶	f/32 @ 1/30 or no. 16	———

*M-2 flashbulbs in Polaroid flashgun with diffuser, one foot from slide holder. A coil cord is used to connect the flashgun to the camera (Accura).

†RFL-2 reflector floodlamp, one foot from slide holder.

‡Electronic flash exposures must be determined for each individual unit, since the light output varies greatly between manufacturers.

§With neutral density filter 0.9.

‖Lamp to holder—16 inches.

¶With Polaroid copy filter. Lamp to holder—14 inches.

determined in the same manner as previously described, is made and the camera is lifted out of the rack. The tab is pulled for development. After the picture has been removed, the camera is again placed in the rack. It is checked for proper seating to assure accurate focus. The resultant print (Fig. 5) is a good size for illustrations.

THE COMPLETE POLAROID CAMERA

The unmodified Polaroid camera may also be used to convert slides to prints. This is accomplished by using auxiliary close-up lenses over the regular camera lens to obtain enlargement of the transparency onto the film in the camera. The method is fairly simple.

The slide holding portion of a pocket viewer is removed from the rest of the viewer by removing the pin holding the viewer together (Fig. 6). This is attached to a series VI retaining ring by four pieces of 1/16 inch plastic. These should be covered, especially on the inside, by black masking tape to cut down reflections. The dimensions are shown in Figure 7. The four panels are joined by Duco cement to form a box, open at both ends. The slide holder is cemented to the larger end. A 20 diopter lens in a retaining ring is fitted to the small end of the copier with self-curing resin (Fig. 8) so that the ring fits flush with the back of the copier. A second retaining ring (a spacer) brings the slide into focus. This unit is attached to the camera lens with an adapter ring. (Tiffen no. 655 screw on for no. 110A or no. SS 32 mm. with a step up ring for other Polaroids.)

The exposure is made utilizing either flash bulbs, floodlights, or electronic flash, for the illuminant. The table lists suggested exposures to be used as a guide for the tests since the exposures must be determined individually for each setup.

Although the pictures obtained with the close-up arrangement demonstrated in Figure 9 are not of as high a quality as those obtained by the other two methods, the advantages of being able to work in daylight instead of in a darkroom are offered and may offset the diminished quality.

Fig. 9 • Photo made with the close-up copier

The cost per picture with the first method is $.52 or $.61 depending on whether type 52 or type 53 film is used. The cost with the second and third methods is $.27.

SUMMARY

Frequently the clinician decides to publish a case report when the patient or specimen is not available for further photography. The conversion of previously taken color slides and roentgenograms to black and white prints usually requires the services of a professional photographer. Three simple methods of converting color slides and roentgenograms to black and white prints suitable for publication are discussed. The clinician, by using a Polaroid camera, can convert the prints himself. The methods are: (1) using the Polaroid 4 by 5 film pack and adapter, (2) using the Polaroid 95 camera body or Graphic Polaroid Back with Pola Pan 200 film, (3) using any Polaroid camera and close-up lenses.

*Chief medical photographer, Isaac Albert Research Institute of the Jewish Chronic Disease Hospital.

1. Black and white prints from Kodachrome transparencies. D. Radiog. & Photog. 19:14 1946.

2. Gibson, H. L. Copying and duplicating medical subjects and radiographs. Springfield, Ill., Charles C Thomas, 1953.

Dental care coverage administered by an insurance company: a symposium

The possibility of insuring dental care has been a subject of study during the past two or more decades by both the dental profession and the insurance industry. Actuaries and experts in the economic aspects of dental practice agreed from the beginning that dental care is difficult to insure because almost everyone suffers from dental disease. Further, the average individual knows reasonably well what his dental needs are and has some notion of the rate at which new dental problems develop. These characteristics of dental disease are recognized as contraindications of insurability.

In August 1959 the Continental Casualty Company and the Dentists' Supply Company cut this actuarial Gordian knot with a bold stroke. Depending heavily on the assumption that the habits of people in meeting their dental needs as well as the frequency of occurrence of need are important factors in the actuarial determination of insurability, these firms launched a dental insurance plan which provides benefits for comprehensive dental care. It was put into effect for all of the employees of Dentists' Supply Company and their dependents, most of whom are located in the York, Pa., plant of that company.

After a little more than a year's experience, three of the principals in the experiment, a representative of Continental Casualty Company, a representative of the Dentists' Supply Company and a dentist participating in the program reported on their experiences with the program to date as part of the scientific program at the annual session of the American Dental Association in Los Angeles. The following papers were presented at this session by Mr. Henry Thornton, president of the Dentists' Supply Company, Mr. Lee Farmer, an assistant vice-president of Continental Casualty Company, and Robert Spangler, a practicing orthodontist in York, Pa.

MANAGEMENT'S VIEWS ON DENTAL CARE IN AN EMPLOYEE BENEFIT PROGRAM

Henry M. Thornton, York, Pa.*

The efforts of groups of employees to protect themselves against the risks of accident and illness certainly antedate the twentieth century. Those efforts were not significantly successful on a wide scale until the 1930's. The literature on the subject indicates that there were hardly any more group health and accident plans in existence in 1930 than there had been in 1900. During the 1930's, two developments provided an initial surge to what has been a continuing increase in the number of group health and accident programs.

The first of those developments was the establishment by some employers of group insurance plans for employees. Many of those plans were supported entirely by management; others were financed by contributions from both employers and employees. The plans were administered by management and did not result from the employer-employee bargaining process. The second development was the enactment of the National Labor Relations Act in mid-1935. That legislation gave labor groups the statutory authority to bargain collectively on questions related to wages, hours and working conditions and contributed to the accelerated growth in the number and size of labor unions.

During the 1940's other events combined to continue the rapid increase in the number and scope of health and welfare plans. During World War II the federal Congress enacted legislation aimed at freezing wages at specified levels. With the approval of the National War Labor Board, many employers established health and welfare plans for their employees as fringe benefits in lieu of wage adjustments in an effort to keep their labor forces intact. The Bureau of Internal Revenue made its contribution by ruling that employers could treat as a business expense the cost of providing group hospital and medical insurance to their employees. In mid-1947, the Taft-Hartley amendments of the National Labor Relations Act established a mechanism under which group health and welfare programs could be negotiated and indicated the responsibilities of management and labor in the operation of such programs. In 1948 the N.L.R.B. ruled that a union-organized employer must bargain collectively with the representative of a majority of his work force on questions related to group health and accident programs.

These events are the more significant historical landmarks in the emergence of health and accident coverage as a normally anticipated condition of employment. Concurrently, during the period 1930-1950, Blue Cross and Blue Shield plans were developed and extensively promoted in many states. Thus the stage was set for the intensive management-labor discussions during the 1950's of group health and accident programs as a fringe benefit of employment.

Now for a quick look at the position today in this continuing evolution of the principle that health care is an item for negotiation between management and labor. One writer recently offered this interesting commentary:

> Therefore management today—more than ever (and perhaps for the first time in many instances) aware of its own objectives in making an employee benefit of health expenses—is interested in providing help with the costs of medical care through plans which are (1) broad in scope and which cover bills inside and outside of the hospitals; (2) meaningful to the individual in financial distress because of illness, and (3) reasonably stable in their costs.
>
> There are a large number of such plans in existence. Basically they cover all or most

reasonable and necessary medical care services and supplies ordered by a physician for the care and treatment of a nonoccupational illness or injury. They provide for protection against medical expenses both in and out of the hospital. They do not all cover the small bills, but may have a deductible, frequently $50 per person, though there is much variety and experimentation in this feature. They pay up to $5,000 to $10,000, even $15,000 per person. Most of them have done away with fee schedules; they pay 75 per cent or 80 per cent of the bill—hospital, physician or nurse—whatever the bill is, provided it is reasonable and customary. They leave the matter of determining what is reasonable and customary to responsible cooperation between the employer, the underwriter, the hospitals and the grievance societies of the medical profession.

These principles underlie the major trend in health expense benefits among employers today and certainly would affect dental benefits provided in the employer-employee relationship. There are, of course, exceptions and objectors. There are a few companies which prefer to pay the small bills, which take the attitude that the plan is established to improve employee relations and more people have small bills than big ones. Almost universally, the union philosophy in the medical care area is opposed to these principles I have enunciated. Unions would like to see all medical care costs—big and small—covered in full.

The historical development of health benefits as a condition of employment, and the current philosophies of management and labor toward programs providing such benefits, served as useful yardsticks when The Dentists' Supply Company determined about five years ago that there was a real need for a comprehensive dental health care plan—one which would provide coverage for every phase of dentistry and which would assure its employees' and the public's right to select the source of its dental care. A survey provided us with information indicating that several so-called dental care plans existed across the country, but each of them had their shortcomings which prevented them from offering truly comprehensive coverage. This fact has encouraged certain employee groups to establish a means for providing their own dental care—the employee sponsored and controlled closed panel dental clinics.

DEVELOPMENT OF PLAN

Because of our long service to the dental profession, our company has acquired some understanding of the many problems which confront the dental profession today. We know that the American Dental Association as a whole is strongly opposed to the imposition of any unwarranted restrictions on the right of the citizen to select the source of his dental care. We felt the time had come to provide some medium through which sufficient and reliable statistics and information on incidence, utilization and cost of dental services could be obtained. This information is essential if private insurance carriers are to develop a truly comprehensive dental health care plan which will be practical from every standpoint and which may be offered nationwide by the carriers at a price which the public would consider reasonable.

It was our hope that the development of a comprehensive dental care plan would go a long way toward discouraging the federal government from intruding further and further into the field of dentistry. Our company has plants in many foreign countries, and we are familiar with the effect of such government intrusion. We in the United States have every right to feel proud of our standard of dentistry, which is the highest in the world, and I feel it is an obligation of every one of us related in any way to the "dental team" to do everything in our power to protect our present high standard, and to improve it wherever possible.

With all of this in mind, and of course with my conviction that the health and morale of our employees as well as of the general public would greatly benefit through a dental care plan which would be comparable, or broader in scope than the better types of medical care plans available across the country, we decided

to tackle the problem, and to underwrite a pilot plan which could serve as a sound basis for the development of the ultimate plan of the future.

Early in the development of the company's dental care program we realized that a very formidable barrier to the development of incidence, utilization and cost data on dental care had been the traditional difficulty encountered in attempting to bring together: (1) the representatives of a sizable group of employees (in our case, management) with sufficient interest and underwriting capital; (2) an adequate administrative agency capable of designing a program, accumulating and interpreting reliable statistics and administering claims and payments nationally; and (3) the national representatives of the profession so that the design and operation of a program would have the benefit of professional advice and assistance. The Company's success in developing a plan for its employees was possible only because we received the full cooperation of the Continental Casualty Company and the American Dental Association.

When we attempted to interest a large insuring company in our company's proposition, we were refused on several occasions, mainly because insufficient data were available for the carriers even to attempt to design a policy.

The insurance executives expressed great concern at the cost that would be involved in bringing the mouths of patients up to a state of maintenance. They were extremely doubtful that a plan could be developed which would cover all phases of dentistry, and insisted that such things as orthodontic care would have to be excluded. Knowing the resistance offered initially by the American Medical Association to the early attempts made by the "the blues" (Blue Cross, Blue Shield, and so on) to provide coverage for medical care, the insurance company representatives were quite sure that similar resistance would be offered by the American Dental Association. They listened patiently to my views on the various questions they raised, but always concluded the meeting with a statement to the effect that the pressure of other matters would make it impossible for them to consider seriously a dental health care plan "at the present time."

After these initial discouraging meetings, the reader can imagine my feeling of relief when I finally contacted a very substantial, responsible, and progressive company which stated they would be interested in starting work immediately on the type of plan I had in mind. This company was the Continental Casualty Company of Chicago. Because of the excellent cooperation of Harold Hillenbrand and other American Dental Association staff members, an initial meeting was arranged in Chicago in January 1959 with representatives of the American Dental Association, Continental Casualty Company and The Dentists' Supply Company in attendance.

The net result of all of the work done over the following seven months by our company, the A.D.A. and the Continental Casualty Company was the development of the Dentsply Dental Health Care Plan which was designed to (1) cover every phase of dentistry, (2) preserve the patient's right of selecting the source of his dental care, and (3) offer coverage to the patient without imposing a fee schedule on the profession. In late July 1959 The Dentists' Supply Company signed a three-year contract with the Continental Casualty Company in which we agreed to underwrite the entire cost of dental care for our employees and their eligible dependents in accordance with the provisions set forth in the insurance policy and guaranteed the insurance company a half-million dollars to meet these costs. A few days later the entire plan was explained at a meeting in York, Pa., to which officers of the Pennsylvania Dental Association and the local dental society were invited, together with dentists prac-

ticing in the York and Philadelphia areas, the cities in which our domestic plants are located. On August 1, 1959 the plan was made effective for our employees and their eligible dependents as an addition to the company's employee benefit program.

COMMENT

As I mentioned earlier, our company offered its employees the first truly comprehensive dental health care plan ever made available. Every phase of dental care is covered in the company plan from the annual dental examination to orthodontics and prosthetics. No limitations are imposed on the right of the employee or his eligible dependents to select the dentist who would provide the required professional services. Coverage is provided under our plan for work performed by any licensed dentist. The program was offered to our employees on a noncontributory basis, which means that The Dentists' Supply Company pays 100 per cent of the insurance premium. The plan incorporates a co-insurance feature (80 per cent to the carrier; 20 per cent to the employee) and also carries a deductible in the amount of $25 in the first year of use and a $10 deductible in subsequent or maintenance years. Said another way, the company pays for the program of coverage and the employee makes his contribution at the time the care is purchased. This is within the policy of the American Dental Association.

The number of persons now covered by the program including employees and their eligible dependents is approximately 2,500.

Naturally, because of so many unknowns, the cost of our program, which is an experimental or pilot plan, was high. The half-million dollars which The Dentists' Supply Company had to guarantee to the Continental Casualty Company for the initial three-year coverage is therefore entirely unrelated to the actual cost per employee per hour or per month. Those costs can now be established by Continental as a result of the first year of experience. During the initial year of the plan approximately 1,500 claims have been presented by 94 out of the 100 dentists who practice in York County. A personal interview survey of the dentists in York County indicates that while the dentists felt that many of their patients from The Dentists' Supply Company would have come to them whether the plan existed or not, the dentists were convinced that those patients from Dentsply were availing themselves of more comprehensive dental care than they would have, had the company plan not been available to assist in meeting the cost of the care. In short, our plan could be credited with having improved considerably the dental care purchasing patterns of our employees and their dependents, particularly in those phases of dentistry involving preventive care and prosthetics.

We are pleased to report also that employee utilization and appreciation of the program's benefits have been excellent. Of course, all of this is helpful to management through the creation of better employee morale, an improved level of health and reduced absenteeism.

The administration of this plan insofar as our company is concerned is negligible, involving less than two hours per week on the part of one person in our personnel department.

With regard to the relative participation of management and the employee in the cost of a comprehensive dental care program, my opinion or personal philosophy on the sharing of costs for such coverage is reflected in the company's program which may be summarized as follows:

First: I believe that both management and the employee should participate in the cost of a dental care program.

Second: I believe that management should undertake to pay 100 per cent of the premiums for each of its employees and that the payment of premiums for

eligible dependents of employees should be left optional with management.

Third: In my opinion, employees should definitely participate in the payment of fees charged for the dental services actually rendered under the program. The sharing of responsibility between management and employee is automatically taken care of in the Dentsply plan through the deductible and co-insurance features. Employees should be vitally interested not only in the selection of the service to be provided by the dentist under the program but also with the over-all cost of that service.

To say it another way, the company plan has been designed to place the full financial burden for the purchase of the plan and its annual premiums on management while the employee or his dependent can determine at the time he purchases dental care the amount of deductible or initial responsibility he must assume and the co-insurance percentage of the total cost of the care that he must ultimately meet. This arrangement provides sufficient flexibility so that management can design and purchase a plan compatible with its financial ability and requires the employee to participate in payment only at the point of purchase of his dental care. At that point he has the option of determining with the dentist of his choice the character and cost of the care he wishes to obtain. Our actual experience over the past year indicates that where a company pays the full premium for its employees, and where a reasonable deductible and a co-insurance feature on the order of 80 per cent-20 per cent are required by the Plan, the actual cost of the over-all coverage is quite equitably divided between employer and employee. This situation makes our Plan comparable with other so-called "fringe benefits" which are now provided by most employers from the standpoint of employee contributions to the benefits, and prevents the dental care plan from getting out of hand costwise. This type of plan also affords an opportunity for the carrier to "specially tailor" policies to meet the requirements of various categories of employers. For example, a company employing only "white collar" workers, such as a large bank, might feel that the employees should pay for normal, routine dental service, but should be provided protection for the rather unusual and more expensive dental services which may be required from time to time. Obviously, our present basic policy could easily be altered to provide "major dental coverage" merely by altering the co-insurance feature from 80-20 to 70-30 or to 60-40 or any other equitable arrangement.

At this stage in the program, 14½ months after the date on which this pilot plan was put into effect with our employees and their dependents, I look upon the Company's Dental Health Care Plan as a successful experiment. As the plan is extended to other groups in other areas of the country, its success or failure will rest ultimately on the dental profession. I am sure dentists will agree that there are a few unscrupulous individuals in every walk of life who will do their best to take unfair advantage of almost any situation presented to them. The dental profession is no exception. Management must rely essentially on the professional conscience of the participating dentist and on the ethics and mediation committees of the state and local dental societies. We sincerely hope and are fully confident that we can count on their full cooperation.

Presented as part of the panel discussion, "Dental care coverage administered by an insurance company," one-hundred and first annual session, American Dental Association, Los Angeles, October 18, 1960.

*President, The Dentists' Supply Company.

THE FIRST YEAR'S EXPERIENCE WITH DENTAL INSURANCE: DENTAL CARE COVERAGE ADMINISTERED BY AN INSURANCE COMPANY

Lee R. Farmer, Chicago

Before reviewing the details of the first year's experience in our experimental dental insurance program at York, Pa., I will discuss the philosophy of our company and some of the background of our participation in the program.

The Continental Casualty Company, and the industry generally, feel that we have a responsibility to study all significant areas of financial uncertainty. We believe further that wherever it is feasible to do so, it is our obligation to devise a plan whereby the individual can protect himself against the financial hazards arising from situations beyond his control. We do not approach the problem as an eleemosynary institution; we believe that the profit motive has given impetus to the search for solutions to the economic problems of the public. The greatness of our country is largely a product of the emphasis that has been placed on enlightened self-interest as the driving force toward national progress.

The need for protection against unplanned for costs of dental care seemed to us a problem to which the insurance industry should give serious consideration. The dental profession recognized this need many years ago and has done much to gather data, devise plans, and establish policies designed to meet the need. We have participated at the fringes of dental insurance for some years through coverage for some dental care as part of our standard health and accident policies and had gained some experience in insuring a portion of the dental care plan of the Longshoremen's Union on the West Coast in the early development of their plan. We became deeply involved when the Dentists' Supply Company requested that we develop a comprehensive dental insurance plan for their employees and the dependents of their employees.

INSURABILITY OF DENTAL CARE

Although we at Continental have had long experience in the field of health insurance, the field of dental insurance represented unexplored territory. We soon found that while a few trail blazers had preceded us, the charting of the course was still far from complete. When we accepted the challenge of setting up a plan, our first step was to obtain all of the information we could regarding the problem. We found, of course, that the American Dental Association, the United States Public Health Service and others had gathered a great deal of valuable statistical data bearing on the problem. We also found recorded a good deal of speculation regarding dental insurance. Unfortunately for our purpose, we found there has been only very limited practical experience in insuring dental care. Although the sparsity of data based on actual experience, in a sense, made the planning more stimulating, it also made its application more hazardous.

It was immediately apparent that dental care does not lend itself to a full application of the classic principles of insurability. The principles of insurance work best when applied to a risk which is infrequent in occurrence and unpredictable for the individual with reference either to frequency or to time of occurrence, but is predictable for the group with reference to both of these factors. This complex statement can be illustrated with simple examples. Risks that are infrequent in occurrence are illustrated by marine insurance. Ships rarely sink, in peacetime at least, but long experience has established the percentage of them which are likely to go down in a given period of time. The particular ships that will be lost cannot be predicted. Risks for which

the timing of occurrence and extent of damage are unpredictable are illustrated by automobile insurance. Most drivers sooner or later are involved in an accident. For the individual, the timing of the accident and the extent of damage are unpredictable but for a large group both factors are predictable. A risk that is certain of occurrence but unpredictable as to time of occurrence for the individual is illustrated by life insurance. Death occurs to everyone, but for the individual the time of death is unpredictable. For a large group the percentage in each age group who will die each year can be predicted quite accurately.

Dental disease differs from all of these conditions in that it attacks most people, and to a degree is predictable for the individual with respect to both time of occurrence and to extent of damage. On the basis of past experience, the individual may have some notion as to his own susceptibility. If everyone were to receive regular and complete dental care, the time of occurrence of dental defects could be predicted with a degree of accuracy even for the individual. All of these factors are contraindications for insurability, especially on the basis of individual enrollment. However, since so few people do receive regular and complete care, their very neglect introduces a measure of insurability into the field of dental care. Neglect of dental health greatly reduces the predictability of the point at which the individual will seek dental care. The accumulation of dental needs culminates for most people in serious and acute conditions that demand the attention of a dentist. Frequently the dental services required to correct such conditions are extensive and consequently costly. The timing of these occurrences is not predictable for the individual, but is predictable and therefore insurable, for a large group. In a very real sense dental insurance can be based on the combined effects of the incidence of dental disease and the habits of people relative to the care of this disease. Thus, insurance can provide the individual financial protection against major and unexpected costs for dental care arising out of these circumstances.

A statement frequently heard is that dental care can be insured only if the individuals participating in the plan first have all their accumulated needs met at their own expense. Thereafter they can be insured for future dental care. Doubtless, this is one way to proceed, but for a large scale program it seems to us to be impractical. We have based our plan actuarially on what I have already described as the combined product of the incidence of dental need and the habits of people in meeting these needs.

THE DENTSPLY PLAN

I have dwelt at some length on the insurability of the costs of dental care. This is an important issue and certainly it represents a knotty problem. However, over and above the need for dental insurance, there is an equally great need for a plan that will enable an individual, and especially a family, to budget the cost of their dental needs. As Dr. Friedrich has said, "there is need for plans to lend financial support to the family in meeting their dental needs." Increasingly the public is supplying its needs for both merchandise and services through purchasing on a budget plan. Automobiles, furniture, clothing, travel and a variety of other commodities and services commonly are purchased this way. The public has demonstrated its willingness to pay for the convenience such plans offer. Credit purchase once was widely criticized as a means by which the improvident individual lived above his means by spending his income before he earned it. Now such buying, when kept within control, is accepted as a means of budgeting income. We recognize that broad areas of routine dental care are not adapted to insurance coverage. These areas are well adapted,

however, to a budget plan. By combining the advantages of both an insurance plan and a budget plan, we believe a service is provided that the public will come to appreciate.

We set up our plan for the Dental Supply Company to cover the full range of dental service. For all employees of Dentists' Supply Company, their spouses and children, our plan provides assistance in financing for all dental conditions, both pre-existing as well as new conditions.

A simplified outline of the operation of the York Dental Plan may be helpful to the reader:

1. What is the scope of services covered?

All types of dental services are included in the coverage provided by the plan, even orthodontic treatment. No dental procedure is ruled out.

2. Who is eligible?

All employees of Dentists' Supply Company who have been with the firm three months or more are eligible for care. Their dependents, including spouse and children, are also eligible.

3. Who pays for the insurance?

The Dentists' Supply Company pays the entire cost of the insurance coverage.

4. Does the insured pay any part of the cost of care?

(a) During the first year in which the Insured or any of his dependents receive dental care, he pays the first $25 of the cost, for each individual in the family receiving care. This we call the "initial year deductible." In succeeding years the deductible is $10 and is called "maintenance year deductible."

The insured pays no deductible amount toward annual examinations including roentgenograms and prophylaxis.

(b) After the deductible charges have been met the Insured pays 20 per cent of the cost of care up to the maximum amount payable by the insurance plan.

5. What are the insurance benefits?

The insurance plan pays 80 per cent of the cost above the deductible amount for all services other than orthodontic care and denture replacement, up to a maximum of $200 per individual or $500 per family during the first year the Insured is in the plan. Recent liberalization of the plan increases this maximum to $300 per individual and $750 per family in the second year, and $400 per individual and $1,000 per family in the third and succeeding years. For orthodontic treatment and denture replacement, the plan pays 60 per cent of the cost up to the stated maximums.

Needless to say we waited eagerly, I might even say anxiously, for the results of our first year's experience. Actually, the rush for service that commonly has been feared in the speculation about dental insurance did not materialize. About half of all eligible participants received some dental care in the course of the year. This is only slightly higher than the national average of 47 per cent of the total population estimated to have visited the dentist. However, the average expenditure for dental care among participants in the plan was higher than the average per capita expenditure among the public. The total per capita expenditure for those eligible for insurance benefits was more than three times the national per capita average in the United States. Interviews with participating dentists revealed that few new patients came to their offices as a result of the insurance plan. They did report a considerable increase, however, in the amount of dental care received by their regular patients who are in the program. Interestingly, they reported a greater willingness of the patients to accept higher quality restorations and prosthetic appliances, for example, gold inlays rather than amalgam fillings and fixed bridges rather than partial dentures.

Although it is not expected that utilization will decrease in the second year of operation, it is considered likely that the average expenditure per participant will

decrease somewhat. Cumulated needs for costly but deferrable dental corrections among adults may have been substantially met in the first year. It is expected, however, that the dental care for children, particularly orthodontic care, may increase in the second year. With increasing understanding of the program it is considered likely that utilization of dental services, especially by children, will increase. Such an increase will mean that dental insurance has led to an improvement in the dental habits of the insured.

The highest level of utilization in the York program occurred among the children, with 55 per cent of those eligible receiving care in the course of the year. The employees followed the dependents as the group making the second highest utilization of the program, with 50 per cent receiving service in the course of the year. Spouses made the least utilization of the three groups, with 46 per cent receiving service.

DISCUSSION

On the basis of the first year's experience with our dental insurance plan at York, we have reached the very tentative conclusion that we will be able to provide dental insurance to comparable groups for something less than $100 per year per family. I want to stress three words in the statement I have just made—the words "tentative" and "comparable groups." I say these conclusions are tentative because they are based on only one year's experience with one relatively small group. Future experience very well may prove the first group to be atypical. I underscore the term "comparable group" for much the same reason. In fact, we feel quite sure that groups with different age, sex, income and educational composition will reveal a different pattern of both need and utilization. We hope to add groups in the near future that do have a different composition in order to check our hypotheses.

Incidentally, there is one aspect of our dental insurance plan which will be of particular interest. Not only is our dental insurance program new, I believe our policy regarding the dentist's charges for his service represents a new approach to problems of how a third party should pay for professional services. Under our plan the dentist is free to charge his regular fee for any service he renders under the plan. We have no schedule of fees or allowances. Between the insurance payment and the insured's deductible and co-insurance payment, the dentist's full fee is being paid. This conforms to our philosophy which favors truly free enterprise and is an expression of our confidence in the integrity of the vast majority of the members of the dental profession. Our experience to date supports the soundness of this policy. We are confident that as our program grows, the dental profession will justify our faith in it.

Recently we conducted a series of detailed interviews with some 20 dentists in the city of York who have participated extensively in the insurance plan. We asked for a candid expression of their views regarding the program—the things they liked, the things they disliked, and an appraisal of the values of the program. Needless to say, to a man they expressed their dislike of "paper work." With this position we agree. We are incorporating their helpful suggestions into the planning of the necessary reporting forms to reduce the required work to a minimum. With this matter disposed of, almost without exception the dentists gave their hearty approval to the program. While, as I have already indicated, they have not found that it has brought many new patients into their offices, they agree that many patients have accepted more corrective work and that the quality of care they are willing to receive has been raised. They were especially appreciative of the way in which care is paid for. They expressed the opinion that the plan was meeting a need and meeting it in a way

that avoids most of the usual objections of the dental profession with respect to a third party intervening in the patient-dentist relationship. They felt that this type of plan, if vigorously developed, will prevent the development of less desirable plans.

Similar interviews with employees of Dentists' Supply Company revealed a high degree of satisfaction with the program. They were most appreciative of this benefit which their employer is providing for them. Many stated that the financial assistance the plan offers had enabled them to have long neglected dental needs taken care of. They expressed the opinion that generally the insurance plan had not made any difference in their relationship with their dentist. They felt that it would be a very good thing if this type of program were made universally available to the public.

We are encouraged by the beginnings of our program. We are inclined to believe that this field, with its very special type of risk, is now ready for the development of large scale insurance plans. That dental health care does not hold a very high place in the budget priorities of the average family, we recognize. However, we are inclined to think that, when a definite plan for the purchase of dental care is available at a price within the means of the average family, dental care will find a more significant place in most budgets. It is recognized that the first major advances in dental insurance will come from employer and union sponsored and financed groups. Once the idea of dental insurance is widely grasped and such insurance is readily available, we believe the public at large will demand it.

Of this we feel confident. Some agency will develop dental insurance. The agencies that logically may be expected to do so are the insurance industry, the dental profession, unions and employer groups, and government. Depending on one's point of view, one or another of these agencies is to be preferred as the one to undertake the job. At Continental we feel the problem of financing dental care is primarily an insurance problem. The rendering of dental service obviously is the province of the dental profession. It would seem to follow that the development of dental insurance should be a cooperative effort of the insurance industry and the dental profession. We are convinced that it is to our interest to assist in the solution of this problem. Of one thing we are reasonably sure, if our industry does not assist in the development of this area someone else will. Should we lose by default we have no one to blame but ourselves.

Both the insurance industry and the dental profession have been concerned about various attempts to solve health problems through legislation. The best defense against undesirable legislation in this field is to preclude the need for such legislation by meeting the problems ourselves. Seldom, if ever, has an industry and a profession cooperated so closely on a project as has been done in the development of this insurance plan. We have looked to the American Dental Association for advice and help as though we all were a part of the same organization. They have responded in like spirit. We have a common cause and a common purpose. Together the insurance industry and the dental profession can, and I believe will, solve this public problem.

310 South Michigan Avenue

Presented as part of the panel discussion, "Dental care coverage administered by an insurance company," one-hundred and first annual session, American Dental Association, Los Angeles, October 18, 1960.

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THE DENTIST-PATIENT RELATIONSHIP

Robert F. Spangler, D.D.S., York, Pa.

The dental profession is interested in health insurance as a mechanism for meeting the costs of dental care. This interest springs from the professional obligation to place service to the public first. The professional obligation is a backdrop against which the dentist's actions and interests are constantly arranged—the obligation never changes, though the social order does.

The early economy of the country was a rural economy, and the social and economic problems revolved around the individual. When the country underwent its tremendous industrial development, the social and economic problems began to call for the collective appraisal of groups of people and the community as a whole. Consideration of the health problems of the individual was expanded to include the health of the public as a whole.

The dental profession, then, can expect to be confronted with ever-increasing demands for an expansion of dental services. As was so well stated in a paper presented before the Seventh National Dental Health Conference in Chicago several years ago,

> No profession conscious of its obligation to society can ignore or frustrate such requests coming from larger and larger groups of the population. Whatever happens in this changing society . . . it is clear that the American people deserve to have a higher level of health care, including dental health care, as a part of their increasing standard of living. It seems obvious, also, that the American standard of living cannot go on increasing, as it has done almost for the last generation, without making a real part of that better standard of life a better standard of dental health care for all the people.[1]

Dentistry has to a great extent developed its own resources. It developed its own educational system, research program and methods of practice. The very nature of dental practice, which has been carried on within the confines of the dental office and dental clinics, has developed the art and science of dentistry to an extremely high level. At the same time, however, it has kept the dentist from broad contacts with the public during a period when the socioeconomic trends have been shifting to the group concept as applied to methods of payment for health care. The dentist, in short, has been so concerned with the development of the scientific knowledge and skills that he has acquired the reputation of being poor at business with a fine product. He has neglected also to realize the availability of other knowledge and skills that can aid him in his efforts to improve the distribution of the basic health service he renders.

In its publication *Group Dental Health Care Programs*,[2] the Council on Dental Health called attention to the fact that the Taft-Hartley Act has established the right of employed groups to demand certain services or money for services in addition to wages. At the Tenth National Dental Health Conference, the Council was advised that the financing of dental care was a valid component of the employer-employee relationship, provided that acceptable methods of furnishing such care were utilized and that nothing in the contractual agreements was in violation of the established policies of the organized profession.

After studying the recommendations handed down to the Council from this conference, the Council of Dental Health developed a separate policy statement[3] which was adopted by the House of Delegates as follows:

> 1. The American Dental Association recognizes the propriety of providing group dental care as a benefit of employment, provided that the methods of financing and administering such programs are in keeping with the policies and principles of the Association.

2. The Association encourages the development of acceptable group dental care programs with participation by dentists in private practice rather than the establishment of facilities by or for the group and the use of salaried dentists.

3. The Association encourages the development of group dental care programs in which the individual is permitted to assume responsibility for a portion of the costs of his dental care.

4. The Association and its constituent and component societies should maintain active communication with all groups interested in the development and operation of group programs for dental care.

With this policy in mind, The Dentists' Supply Company of New York, whose main office is located in York, Pa., established a group dental care plan with the approval of the York County Dental Society. This paper will attempt to evaluate the actual operation of the plan from the private practitioner's viewpoint.

The Comprehensive Dental Health Care Plan of the Dentists' Supply Company has been in operation since April 1, 1959 with 92 out of the total membership of 101 members of the York County Dental Society participating in the plan and serving 2,309 employees and their dependents. From April 1, 1959 to the present writing, there have been 1,048 claims processed and 771 claims paid. These claims run from a high of 60 per dentist to a low of one per dentist with an over-all average of ten claims per dentist in York County. The fact that 92 per cent of the dental practitioners in York County are participating in the plan indicates that this type of group coverage for dental services is held in high regard by a representative group of the dental profession.

One of the most significant observations since the initiation of the plan is that neither my colleagues nor I have experienced any change in the nature of our practices. We have had no appreciable increase in new patients and I have found that the regular patients have shown no sudden desire to have immediate appointments in order to start any dental work that they may have been deferring for financial reasons. The patients who are members of this plan have come at their regular recall appointment for periodic dental examination. At this appointment a prophylaxis and bitewing examination are performed, the patient's mouth charted on the insurance form, and the treatment plan outlined. Since these patients have been under regular dental care, there has been, in my experience, very little need for extensive operative procedures. A few of my associates have found that some patients have had work done that they had been delaying for financial reasons; for example, jacket crowns or replacement of missing teeth. As a matter of fact, a lot of my patients who have been under regular dental care feel that the plan is not really doing much for them. Some patients are embarrassed about using the plan, feeling that it is like taking charity. However, these patients are few in number and the real object of the plan is to help those individuals who have difficulty in meeting the financial obligation involved in comprehensive coverage of the dental needs of the family. My practice is limited to children, and I can assure you that there is a definite financial "road-block" preventing children from enjoying the benefit of good dental care.

The biggest challenge that the plan will have to meet is in the field of patient education. The employee must see the importance of establishing good oral health and must have the desire that he and his dependents obtain the proper dental care in order to achieve this goal. Unfortunately, only a small percentage of children under five years of age have had dental care under this plan so there is a definite need to get parents interested in good dental health education. This will bring about earlier dental examinations for their children and ease the cost of oral maintenance in the future.

There has been increased interest in

one phase of dentistry; that is, in orthodontics. Parents have shown more concern about having the malocclusion in their children's mouths corrected and have taken advantage of the coverage that the plan gives them for orthodontic care. All of this seems to add up to the following: as long as we can keep finances out of the picture we can get the parents to accept complete as against partial care. The patient-dentist relationship is greatly improved because the financial problem is greatly reduced. When the dentist sits down with the patient and discusses his treatment plan, he can be much more at ease and feel free to present the best type of dental treatment plan that he is capable of performing. I had one father of nine children accept complete coverage for his four year old daughter, who otherwise would have had only a necessary extraction, since he could afford complete dental care because of being a participant of the plan. Reducing the financial burden for the patient is, in my opinion, the most significant advantage that a comprehensive dental care plan can offer the profession. Most of my colleagues also feel that this is the main reason they are interested in seeing the plan succeed; they want their patients to accept the best type of dental service that they can recommend to them. In fact the only disadvantage in the plan is the paper work that is involved. The dentist is required to chart the restorations present in the individual's mouth at the time of the initial examination. This entails some time and those of us who are participating in the plan feel that it is wasted time, since in some instances the work may have defects that will require replacement of the restorations. I understand that the insurance company is considering making some changes in the examination form to overcome this objection.

This Comprehensive Dental Health Care Plan in York is the dentist's plan and is a bulwark against socialization. Unquestionably, all the employees are greatly benefited by the coverage, particularly, of course, those in the lower income level. A program such as this cannot help but improve the practitioner-patient relationship, the standing of dentistry among the healing arts, and the stature of the practitioner on the local level.

955 South George Street

Presented as part of the panel discussion, "Dental care coverage administered by an insurance company," one-hundred and first annual session, American Dental Association, Los Angeles, October 18, 1960.

1. Hillenbrand, Harold. Dentistry's responsibility in the changing socioeconomic pattern. J.A.D.A. 54:164 Feb. 1957.

2. American Dental Association, Council on Dental Health. Group dental health care programs. Chicago, American Dental Association, 1955.

3. American Dental Association Transactions 1959, p. 46.

Serving Democracy • The best argument for democracy is the existence of men who justify that optimism. It follows that one of the best ways to serve democracy is to be that kind of man. When you see such men and women, tip your hat and bow. The future of our civilization is in their hands. *Life Magazine. The National Purpose. John W. Gardner. Chicago Daily News June 25, 1959.*

reports of councils and bureaus

Hospital dentistry and the Joint Commission on Accreditation of Hospitals

COUNCIL ON HOSPITAL DENTAL SERVICE

The quality of hospital care has been a perplexing problem for some time. The first attempts at standardizing norms for patient care became a project of the American College of Surgeons. The College at first set up standards for qualifying the hospital as a suitable place for members of the College to perform surgery. As the inspection program became more widespread, increased emphasis was placed on the quality of patient care.

It has not been long since most hospitals were considered a place to die or a place to quarter the ravages of infections. Only after the turn of the twentieth century did hospitals earn the title of acute surgical institutions, and only in the past two score years have they become acute medical institutions as well. With this expansion of medical care came more and more emphasis on the quality of patient care. The American College of Surgeons' program of inspection of hospitals became more intense and necessitated the combined attention of the medical profession and the hospital profession. Thus the Joint Commission on Accreditation of Hospitals was conceived.

In January, 1953 the Joint Commission on Accreditation of Hospitals was created by the following five organizations: American Hospital Association with seven voting members; American Medical Association, six voting members; American College of Physicians, three voting members; American College of Surgeons, three voting members; Canadian Medical Association, one voting member. In 1959 the Canadian Medical Association resigned from the Commission to create a similar agency in Canada. The seat left open by the resignation of the Canadian Medical Association was assumed by the American Medical Association. Originally, the seat had belonged to the American Medical Association which relinquished it to the Canadian Medical Association. The

Joint Commission now consists of four member organizations.

The American Dental Association on several occasions presented to the Joint Commission formal requests for representation on the Commission. The Commission has indicated to the Association, and to all other interested agencies, that at the present time no additional members are being considered. The introduction of a new member into the Commission would create serious problems in connection with the delicately balanced voting procedures which now exist. The Joint Commission was informed by the American Dental Association that it does not now have member associations of any kind which could claim to be qualified to represent the dental profession. Only through this Association can dental representation be provided, and such representation is essential to the development of adequate hospital dental programs. At their September, 1960 meeting, the Commissioners agreed with the Association that in lieu of full membership, a liaison committee be established which would meet, subject to call of either organization, whenever there was a mutual problem in hospital dentistry to discuss.

The position of the dentist on the hospital staff and the position of the dental service in the administrative and professional organization of the hospital have become focal points of attention for the past several years for both the chief of the dental service and the hospital administrator. In 1954 the House of Delegates directed that the Council on Hospital Dental Service seek "an explicit statement of a standard [by the Joint Commission] pertaining to dental services rather than 'interpretations' of the existing dental standard."[1] A statement on the dental standard proposed by the Council was approved by the House of Delegates in 1955.[2] This statement was submitted to the Joint Commission for consideration. Subsequently, a reply was received from the director which contained the working policy of the Joint Commission.[3] A single statement incorporating the policies of the Joint Commission and the standard of the Association was developed and was approved by the House of Delegates of the Association in 1956.[4] It was submitted to the Joint Commission, but no official action on the statement was taken by that agency.

Early in 1960, the Joint Commission indicated that a complete revision of its *Standards for Hospital Accreditation* would be undertaken. Staff members of the Council and the Joint Commission met several times to draft a new statement of the dental standard in *Standards for Hospital Accreditation*. The draft was based on the statement which had been approved by the House of Delegates in 1956.[4] After careful consideration, the Council presented to the Joint Commission for its meeting on April 30 the following statement which later was approved by the House of Delegates at Los Angeles.[5]

RESTATEMENT OF
"DENTAL STANDARD"

Dental Department: The dental staff shall be organized under the applicable standards established for the medical staff.

a. Members of the dental staff must be qualified legally, professionally and ethically for the positions to which they are appointed.

b. The dental staff shall be responsible for the maintenance of the proper quality of dental care and treatment.

c. Dental patients may be admitted to, and discharged from, the dental department or the section of oral surgery by the dentist. There should be medical supervision available for the medical aspects of dental patients throughout their hospital stay.

d. Proper dental staff bylaws, rules and regulations may be written in either of two ways:

1. as combined medical and dental staff bylaws using the desired language throughout where pertinent, or

2. as separate departmental bylaws, rules and regulations.

Following the April 30 meeting, the director of the Joint Commission informed the secretary of the Council that several committees were appointed for revision of the standards for hospital accreditation. The director further indicated that the revisions would be considered by the Commissioners at two meetings scheduled for September and December, 1960. At the December meeting, the Commissioners adopted the following statement as the dental standard in the *Standards for Hospital Accreditation:*

Dental Service or Department: According to the procedure established for the appointment of the medical staff, one or more dentists may be appointed to the dental staff. Where more than a few dentists are so appointed, a dental service may be organized. The organization of the Department of Dentistry shall be comparable to that of other services or departments. Whether or not the dental service is organized as a department, the following requirements shall be met:

a. Members of the dental staff must be qualified legally, professionally, and ethically for the positions to which they are appointed.
b. Patients admitted for dental services may be admitted by the dentist either to the Department of Dentistry or if there is no department, to an organized clinical service.
c. There must be a physician in attendance who is responsible for the medical care of the patient throughout the hospital stay. A medical survey shall be done and recorded by a member of the medical staff before dental surgery is performed.

In its booklet entitled, *Explanatory Supplement to the Standards for Hospital Accreditation,* also issued in December 1960, the Joint Commission makes the following observation in regard to the dental service or department:

Patients admitted to the hospital for dental care must be given the same careful medical appraisal as those admitted to other services. This makes the care of dental patients the dual responsibility of the dentist and a physician, each limited to his respective field; the dentist to the buccal [oral] cavity and jaws, and the physician to the medical aspects. Policies concerning the admission and discharge of dental patients should be mutually agreed upon by the medical and dental staffs and clearly stated in the bylaws. The important factor is not the procedure but the assurance that the dental patient is well cared for by both the dentist and the physician.

The purpose of the foregoing paragraph is to explain the meaning of the dental standard and the underlying reason for it. The explanation should be used as a supplement and not as a substitute for the dental standard.

COMMENT

The Council recommends that a dental service should be formed where several dentists are on a hospital staff. The service should take the form of a Department of Dentistry which shall be at the same organizational level as the other departments in the hospital.

The Commission's standard specifically states that dental patients may be admitted by the dentist to the Department of Dentistry.

The Council is of the opinion that much progress has been made in determining the position of the dentist on the hospital staff. The Council will continue to work and confer with the Joint Commission on Accreditation of Hospitals on matters relating to hospital dentistry.

1. American Dental Association Transactions 1954, p. 273.
2. American Dental Association Transactions 1955, p. 204.
3. American Dental Association Transactions 1956, p. 61.
4. American Dental Association Transactions 1956, p. 206.
5. American Dental Association Reports of Officers and Councils 1960, p. 88.

Trends in dental school and dental hygiene school enrollments

COUNCIL ON DENTAL EDUCATION

Records maintained by the Council on Dental Education relative to the number of dental students and dental graduates along with the records maintained by the Association's Bureau of Economic Research and Statistics on the number of practicing dentists enable reports to be made to the profession periodically on the "manpower" problem in dentistry.

In the Fall of 1960, the 47 dental schools had the largest enrollment of dental students of all time, including the years during World War I and World War II when many of the schools were offering accelerated programs. The dental schools currently have an undergraduate enrollment of 13,580 students. In addition, more dentists are enrolled in formal graduate and postgraduate programs than at any other time—646 graduate students and 630 postgraduate students. The latter figures do not include the dentists enrolled in institutions without dental schools nor the approximate 7,500 who attended the short refresher-type courses in dental schools last year.

Much has been written about the decrease in the number of dental school applicants during recent years when the schools could have taken more students than they finally accepted. Immediately after World War II, there were approximately 11,000 applicants for nearly 3,000 positions in the 40 dental schools in operation at that time. This large number of applicants was a backlog of those who had had to postpone their dental education during the war. The number of yearly applicants then averaged about 6,000 until it started dropping off in 1957.

The low birth rate of about 20 years ago has had its limiting effect on the number of applicants to all professional schools. This past year, a low of about 5,200 students made application for the 3,812 positions available for freshmen in the dental schools. The 164 vacant places may cause some concern but it also shows that admission committees are concerned in selecting only students whose records point toward a strong likelihood for success in dentistry. Figure 1 offers a five-year picture of the gradual increase in the freshman class enrollment and the more noticeable decrease in the number of students taking the aptitude tests, which is a relative indication of the annual number of applicants. First year classes have increased in this five-year period by a total of 87 students, from 3,561 accepted in 1956 to 3,648 in 1960; and have increased by 674 in the last 14 years.

A recent study by the Council indicates that there are some well-qualified students who are not being admitted to dental school the first year of application because in some instances they limit their interest to only one school or to schools

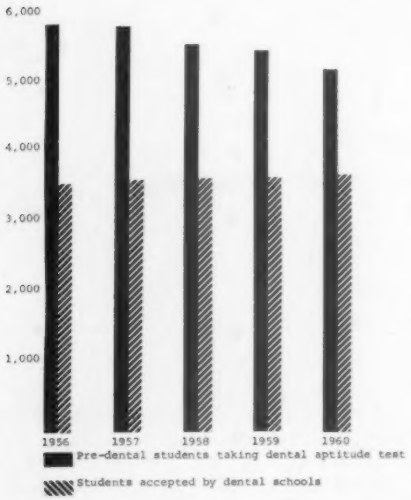

Fig. 1 • Comparison by year of predental students taking dental aptitude tests and students accepted by dental schools

in an area likely to receive a high number of applications from well-qualified students. Some of these well-qualified applicants do complete more university study and are eventually accepted into dental school. A few of these applicants decide to enter another professional field, but this is a very small number, less than 60 in any one year according to the study the Council has made. Most students file from three to five applications with a result that for the present class the schools had from 1.7 to 15.3 applications for each of the positions filled. However, because of these multiple applications and the reduced number of applicants there was a ratio of only 1.42 applicants for each freshman vacancy for the 1960 first year class.

There are 47 dental schools which will graduate classes in 1961 and another new school begins operation this year. This means an increase of about 20 per cent in the number of schools in the last 20 years. The number of graduates has increased from 1,561 in 1930 to 1,757 in 1940 and to 3,253 in 1960; a gain of 108 per cent in 30 years or an increase of 85 per cent in the last 20 years. These numbers are not sufficient to provide the same ratio of dentists to population in the future for it is estimated that even with additional schools, which are expected to open, the ratio of dentists to population will be about 1:2,450 in 1975 as compared with the ratio of 1:2,150 in 1960.

It should be pointed out that the dental schools are maintaining high standards of admission. They all select their new students on the basis of a number of factors which allow some prediction of the student's probable success in dental school. These selection methods, which include the Association's Aptitude Testing Program, for all schools require these tests, have now reduced the loss of freshman students due to academic failure to approximately 2 to 3 per cent for the nation. The over-all loss for the four year program for all reasons is only about 8 per cent, meaning that 92 per cent of all entering freshmen obtain either a D.D.S. or D.M.D. degree.

The dental profession now has educational standards and requirements for all of its auxiliary dental personnel. It has had such standards for dental hygiene since 1947. Anticipating not only an increase in the population but also an increase in the public's demand for dental service, the profession has advocated the increase in dental hygiene programs. Even though the number of dental applicants has shown some decrease in recent years, it is gratifying to know that the number of dental hygiene schools, dental hygiene graduates, and dental hygiene applicants has each increased significantly. The number of schools has grown from 16 to 37 in a ten-year period with two more scheduled to begin next year, representing a gain of 144 per cent. Figure 2 shows the increase in the number of first year dental hygiene freshmen in the last ten years. The increase in these classes plus increased

emphasis on admissions procedures explains why there has been a gain of nearly 100 per cent in the number of graduates, with 992 students graduated in 1960.

As in the case of the dental school freshman classes, there are some vacancies in the first year dental hygiene programs with 70 positions unfilled last year and 44 in the present class. These vacancies are a matter of concern when graduates are needed for the future, but it is gratifying to be assured that the dental hygiene programs accept only those students they believe will be successful in school as well as be highly qualified to work under the supervision of the dentist in providing dental care to the public. The problem of maintaining an adequate supply of dental hygienists is more difficult than that of supplying dentists for practice. This is due to the fact that while nearly all dental graduates remain in practice for many years, a large number of dental hygienists are lost to the practice each year and many of them do not return to this work. Schools are studying methods of recruiting a larger percentage of women in an older age group with the hope that they may make a longer career of dental hygiene.

Although these reports on the number of graduating dental students and dental hygiene students show that we cannot maintain quite the same ratio of dentists to population that we have had in the past, it is also to be realized that the problem of providing sufficient dental service is not related entirely to numbers. Reports of the Association's Bureau of Economic Research and Statistics have shown that in a ten year period, the average dentist has increased his productivity approximately 29 per cent. This increase has been sufficient to offset the increase both in population and in the demand for dental care in the same period.

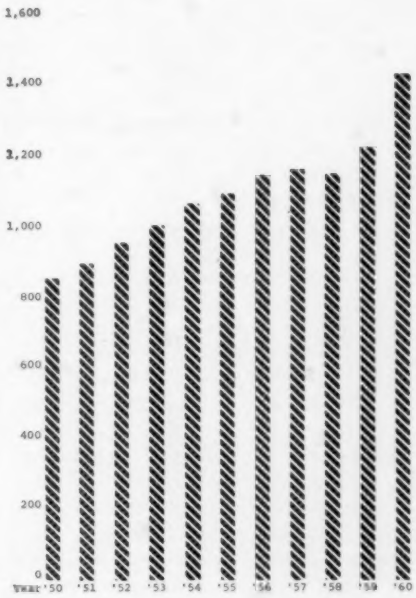

Fig. 2 • Enrollment by year of freshman dental hygiene students

Therefore, it is reasonable to expect that the dental health team in 1975 will provide a greater amount of service and hence be able to provide dental service for all who seek it. Presently, one of the dental schools has an accelerated program which permits a greater number of students to be educated in the same amount of time; other schools are giving thought to methods by which their facilities might be used to produce larger graduating classes in the future, if this is necessary. This is evidence that dental educators are cognizant of their responsibility for providing an adequate supply of dental school graduates of extremely high quality so that the dental profession can be assured of having the personnel to provide the dental service that will be needed by the public in the future.

National Civil Defense Conference: Part 2

COUNCIL ON FEDERAL DENTAL SERVICES

There follows a digest of the address presented by Congressman Chet Holifield at the Second National Dental Civil Defense Conference held in Los Angeles on October 15, 1960.

Fifteen years ago the world was stunned by the awesome destructive force unleashed against the hapless cities of Hiroshima and Nagasaki. The long, hard struggle against Japan was abruptly and dramatically halted. Millions rejoiced at the prospect of a long enduring peace. The destructiveness of nuclear weapons, said the statesmen, ruled out the possibility of any future large-scale war.

In retrospect, we see that the devastation of Hiroshima and Nagasaki did not usher in an era of good will around the world. Tensions have steadily mounted between the East and West. The Hiroshima weapon of 15 years ago—equivalent to 20,000 tons of T.N.T.—has given way to weapons a thousand times greater in explosive force.

The devastation and chaos that would befall a nation attacked with nuclear weapons is almost beyond comprehension. A single 10-megaton weapon, burst at ground level, would dig a crater 2,500 feet in diameter and 240 feet deep at the center. Brick structures would be destroyed within a radius of seven miles and wood frame structures would collapse out to a distance of nine miles. Light kindling materials would be ignited by the intense thermal effects within a radius of 25 miles. Lethal radioactive fallout would extend over much larger areas.

Last year, the special radiation subcommittee of the Joint Congressional Committee on Atomic Energy held a series of hearings to determine the probable effects which an enemy attack employing nuclear weapons would have on the United States. The subcommittee assumed a hypothetical attack in which 263 nuclear weapons, ranging in size from one megaton to ten megatons each, were detonated on 224 targets within the United States. The expert testimony and supporting scientific data indicated that under existing conditions such an attack would have cost the lives of 50 million Americans, with some 20 million others sustaining serious injuries. More than one fourth (11.8 million) of the dwellings in the United States would have been destroyed and nearly ten million others would have been damaged. Some 13 million additional homes would have been severely contaminated by radioactive fallout. Altogether, about one half of the existing dwellings in the United States would have been destroyed or rendered unusable for a period of several months.

The survivors of the immediate effects of this attack would have found their environment contaminated by widespread radioactive fallout. Much of our livestock and food crops, as well as existing stores of processed foods, would have

been destroyed or heavily contaminated. Medical supplies, clothing, bedding and blankets, drinking water and many other necessities of bare survival would be in critical short supply.

When the dust and rubble of such a nuclear war had finally settled, the survivors would face a long-term recovery task of overwhelming proportions.

There are some, of course, who say it is all too horrible to contemplate, that it is hopeless to think of surviving such an attack and rebuilding a viable economy.

Our nuclear war hearings, however, not only demonstrated the destructiveness of a possible enemy attack, but also indicated that proper civil defense preparedness would drastically reduce the impact of such an attack on our country. Civil defense preparedness would have reduced the estimated fatalities in this exercise from more than 25 per cent of our population to about 3 per cent. The key measure of such preparedness would be shelter protection for the people.

The value of civil defense, it should be emphasized, is not limited to the humanitarian virtue of saving lives, but extends also to broad strategic considerations. A few months ago Army Chief of Staff General Lyman L. Lemnitzer noted that the Soviet Union is steadily improving its civil defense preparedness and expressed his conviction that a strong U. S. civil defense program would constitute "an important element of our over-all deterrent." The extent to which our country could withstand and recover from the effects of an enemy attack, according to General Lemnitzer, would have an important bearing on the enemy's decision to attack.

Though there is no lack of information on the part of OCDM with respect to these pressing civil defense requirements, the administration has refused to take the steps necessary to meet these requirements. No federal plan for action has been undertaken. The present administration policy is that the states and localities must shoulder the burden of civil defense operations, despite the obvious inability of the states and localities to provide for the civil defense needs of our country. Today—15 years after Hiroshima and more than seven years after the development of the hydrogen weapon —no significant progress has been made in the civil defense field. The "do-it-yourself" national shelter policy of the present administration has failed to meet our national civil defense shelter requirements.

Congress must share the blame for shortcomings in the make-up and operation of federal programs. Federal programs are essentially a joint executive-legislative responsibility. But in any major endeavor, the vital factor is executive leadership. Congress must look to the president for the formulation of basic plans to achieve national purposes.

In the field of civil defense, executive leadership has not been forthcoming. The administration has not formulated a program which can meet the vital civil defense needs which now confront our nation. The "Paper Plan" for civil defense as set forth by the OCDM is a monument to Madison Avenue; it does not give us civil defense preparedness, but it sounds good and it has the virtue of not costing the federal government any money.

When the time comes that the executive head of our federal government begins to face up to the grim realities of survival in the nuclear age, then it will be possible for our nation to begin the hard tasks that must be undertaken if we are to have an effective civil defense program.

Council announces classification of additional products

COUNCIL ON DENTAL THERAPEUTICS

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional products have been classified in Group A:

Hyaluronidase, U.S.P. (See A.D.R. 1961, p. 150)

Hyazyme (Abbott Laboratories): A brand of hyaluronidase for injection, U.S.P. Supplied as a lyophilized powder in 1 ml. vials, singly and in boxes of 25, each containing 150 U.S.P. units of hyaluronidase for reconstitution with 1 ml. of water for injection, U.S.P., or in other infusion solutions.

Wydase (Wyeth Laboratories): A brand of hyaluronidase.

Lyophilized Wydase: A brand of hyaluronidase for injection. Supplied as a lyophilized powder of hyaluronidase and a preservative in 1 ml. and 10 ml. vials, containing respectively 150 and 1500 U.S.P. units of hyaluronidase for reconstitution with injection sodium chloride, U.S.P.

Solution Wydase (Stabilized): Each ml. is stated to contain hyaluronidase, 150 U.S.P. units, in water for injection, U.S.P., with stabilizers and a preservative. Marketed in 1 ml. and 10 ml. vials.

Lidocaine Hydrochloride (See A.D.R. 1961, p. 27)

Xylocaine Viscous (Astra Pharmaceutical Products, Inc.): Each 100 ml. is stated to contain lidocaine HCl, 2 Gm.; sodium carboxymethylcellulose, 2.5 Gm.; methylparaben, 0.07 Gm.; propylparaben, 0.03 Gm.; flavor and distilled water.

Dexchlorpheniramine Maleate (See A.D.R. 1961, p. 14)

Polaramine Maleate (Schering Corporation): A brand of dexchlorpheniramine maleate.

Polaramine Maleate Tablets, 2 mg.: Each tablet is stated to contain dexchlorpheniramine maleate, 2 mg., together with excipients and color.

Polaramine Maleate Repetabs, 4 mg.: Each tablet is stated to contain dexchlorpheniramine maleate, 4 mg., divided equally between the tablet core and the covering, together with excipients and color.

Polaramine Maleate Repetabs, 6 mg.: Each tablet is stated to contain dexchlorpheniramine maleate, 6 mg., divided

equally between the tablet core and the covering, together with excipients and color.

Carboxymethylcellulose (See A.D.R. 1961, p. 128)

The following product has been reclassified from Group B (see report, J.A.D.A. 59:156 July 1959) to Group A by the Council on Dental Therapeutics:

Surgicel Absorbable Hemostatic Cones (Johnson & Johnson): Compressed cones of purified carboxymethylcellulose.

Benzalkonium Chloride, U.S.P. (See A.D.R. 1961, p. 98)

Benz-All Brand of Benzalkonium Chloride (Xttrium Laboratories, Inc.): Each 100 ml. is stated to contain benzalkonium chloride, 12.5 per cent; sodium nitrite, 22.5 per cent; sodium acid phosphate, 0.1 per cent; propylene glycol, 37.5 per cent, and water. This is a concentrated dosage form intended for dilution with water, according to the directions for its use, to produce a 1:1,000 solution of benzalkonium chloride. An anti-rust factor is included.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

The following additional products are classified in Group B:

Chloroprocaine Hydrochloride (See A.D.R. 1961, p. 26)

Versacaine (Lederle Laboratories): A brand of chloroprocaine hydrochloride.

Versacaine 2%, Epinephrine 1:100,000: Each ml. is stated to contain chloroprocaine HCl, 20 mg.; epinephrine, 0.010 mg.; methylparaben, 1 mg.; sodium chloride, 4 mg.; sodium sulfite, 2.66 mg., and water for injection. Marketed in 1.8 ml. cartridges.

Isobucaine Hydrochloride (See A.D.R. 1961, p. 30)

Kincaine Hydrochloride (Oradent Chemical Co., Inc.): A brand of isobucaine hydrochloride.

Kincaine HCl 2%, Epinephrine 1:65,000: Each ml. is stated to contain isobucaine HCl, 2 mg.; epinephrine, 0.015 mg.; sodium chloride, 4.5 mg.; sodium bisulfite, 2 mg.; methylparaben, 1 mg., and water for injection. Marketed in 1.8 ml. cartridges.

Mepivacaine Hydrochloride (See A.D.R. 1961, p. 28)

Carbocaine Hydrochloride (Cook-Waite Laboratories, Inc.): A brand of mepivacaine hydrochloride.

Carbocaine HCl 2%, Neo-Cobefrin 1:20,000: Each ml. is stated to contain mepivacaine HCl, 20 mg.; levo-nordefrin, 0.05 mg.; sodium chloride, 4 mg.; acetone sodium bisulfite, not more than 2 mg., and water for injection. Marketed in 1.8 ml. cartridges.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the product cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

Additions to the Library

BUREAU OF LIBRARY AND INDEXING SERVICE

The books listed here have been added recently to the Bureau collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing books, but there is a minimal charge of one dollar for each package library. Practically all the dental journals published in the world at present are available to members on loan. Lists of books and package libraries are available on request.

BOOKS

ACADEMY OF DENTURE PROSTHETICS. NOMENCLATURE COMMITTEE. Glossary of prosthodontic terms. (*Journal of Prosthetic Dentistry*, Vol. 10, Nov.-Dec., 1960, part 2.) St. Louis, Mosby, 1960. 39 p.

AMERICAN DENTAL ASSOCIATION. Conference on professional association group insurance programs, Chicago, September 9-10, 1960. Chicago, 1960. 129 p. Mimeo.

ARNDT, W. V. A procedure for parenteral injection of the temporomandibular joint of the cynamologus monkey. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 60 p. Typewritten.

BENSON, H. J. & KIPP, K. E. Dental science laboratory guide. 2d ed. Dubuque, Iowa, Brown, 1958. 139 p. $2.75.

BERNIER, J. L. Tumors of the odontogenic apparatus and jaws. (Atlas of tumor pathology, Sect. 4, Fasc. 10a.) Washington, Armed Forces Institute of Pathology, 1960. 107 p. $1.

BETTMANN, O. L. A pictorial history of medicine; a brief, nontechnical survey of the healing arts from Aesculapius to Ehrlich, retelling with the aid of select illustrations the lives and deeds of great physicians. Springfield, Ill., Thomas, 1956. 318 p. $9.50.

BILDKATALOG DER PROTHETIK. Cologne, Neuer Merkur, 1958. 102 p. $5.

CANNEL, W. A. Medical and dental aspects of fluoridation. London, Lewis, 1960. 125 p. $2.40.

CHAVES, M. M. Manual de odontologia sanitária. Vol. 2: Pratica da odontologia sanitária. São Paulo, 1960. 321 p.

THE DOCTOR'S TAX LETTER, Inc. Tax handbook for medical men, 1961. Chicago, 1960. 32 p. $2.50.

FORSSLUND, GÖSTA. The structure and function of the capillary system in the gingiva in man; development of a stereophotogrammetric method and its application for study of the subepithelial blood vessels in vivo. (*Acta Odontologica Scandinavica*, Vol. 17, Sup. 26.) Stockholm, 1959. 144 p. $11.

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GRANT, L. E. A radiographic study of the hyoid bone position in Angle's Class I, II and III malocclusions. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 32 p.

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HELD, A. J. & CHAPUT, ANDRÉE. Les parodontolyses; pathologie-clinique, thérapeu-

tique. Paris, Prélat, 1959. 360 p. $26.50.

HOFER, OTTO & SCHWARZ, M. A. Zahnheilkunde, Kieferchirurgie, Orthodontie. (Therapie und Praxis, Heft 12.) Vienna, Urban & Schwarzenberg, 1958. 52 p. $2.50.

HOFFMANN-AXTHELM, WALTER. Lehrbuch für das zahnärztliche Hilfspersonal. 4th ed. Leipzig, Barth, 1959. 396 p. $5.95.

INGELMARK, B. E. & OTHERS. Spinal joint changes and dental infections. (*Acta Anatomica*, Vol. 38, Sup. 36.) Basel, New York, Karger, 1959. 60 p.

INGINO, A. L. An evaluation of the emotional response of the child dental patient to injections. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 36 p. Typewritten.

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KUTTLER, YURY. Endodoncia práctica; para estudiantes y profesionales de odontología. Mexico, D. F., Editorial Alfa, 1960. 303 p.

MANHOLD, J. H. & BOLDEN, T. E. Outline of pathology. Philadelphia, Saunders, 1960. 340 p. $4.75.

MASON, A. A. Hypnotism for medical and dental practitioners. With chapters on hypnosis in dental surgery and obstetrics by K. D. Watts and S. D. Perchard. London, Secker & Warburg, 1960. 223 p. $4.80.

MATHIS, HERMANN. Problemas de la infección focal dental. Buenos Aires, Editorial Mundi, 1957. 135 p.

PARMA, ČESTMÍR. Parodontopathien. (Zahnärztliche Fortbildung, Heft 13.) Leipzig, Barth, 1960. 203 p. $5.

PAZUREK, STANISLAUS. Die erneute Zunahme der Zahnkaries und ihre Bekämpfung durch eine planmässige Schulzahnpflege. Berlin-Tempelhof, Walther, 1951. 28 p.

PORCH, R. C. The incidence of certain oral lesions in the population of a Veterans Administration domiciliary. (M. S. thesis—University of Kansas City.) Kansas City, 1960. 51 p. Typewritten.

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PERIODICALS

NEWS AND VIEWS. (Montreal Dental Club)

The 1959 survey of dental practice
IX. Dentist busyness

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

In the preceding chapter it was shown that the number of patients treated by the average dentist was considerably higher in 1958 than in 1955. The questionnaire included a question to determine how many dentists consider themselves too busy and how many not busy enough. Another question related to the average length of wait for an appointment. These questions were also asked in earlier surveys of dental practice, providing a measure of trend in the dental profession's ability to meet the demand for dental care.

One of the questions relating to busyness was "During 1958, approximately how long did your average patient have to wait for the initial appointment of a series (excluding emergency cases)?" Respondents were asked to check one of the eight responses shown in Table 74. The other question relating to busyness was "Which of the following statements comes closest to describing your practice for the year 1958 as a whole?" This question was followed by the four alternative answers shown in Table 75.

More dentists checked "one week" than any other length of wait for an appointment (Table 74). This reply was checked by 21.9 per cent of the nonsalaried dentists responding. A large number of dentists also checked "three to six days" (19.2 per cent), "one or two days" (18.6 per cent) and "two weeks" (17.4 per cent). "Six weeks or more" was answered by 6.3 per cent of the respondents.

More than four out of 10 dentists (43.5 per cent) indicated they were too busy in 1958—either unable to accommodate all who requested care or felt overworked in doing so (Table 75). At the other end of the scale, 18.1 per cent said they did not have enough patients. The remainder, 38.4 per cent, indicated they provided care for all who requested it, and did not feel overworked.

BUSYNESS BY AGE OF DENTIST

About half of the dentists under 30 years of age reported that the average patient's wait for the initial appointment was only one or two days (Table 74). Less than 16 per cent of the dentists aged 30 to 49 reported such a short waiting period.

The average wait for an appointment was 6.9 days for dentists under 30 and the same for dentists 70 and older. The longest wait was reported by dentists aged 30 to 49—about 12.5 days. The decline in length of waiting period among dentists in their 50's and 60's was moderate, but pronounced for dentists in their 70's.

Table 74 • Percentage distribution of nonsalaried dentists by average wait for an appointment in 1958, by age

Average wait	Age						All ages
	–29	30–39	40–49	50–59	60–69	70–	
One or two days	50.5	15.8	15.8	17.5	21.9	37.8	18.6
Three to six days	13.8	20.6	16.1	22.8	15.0	28.9	19.2
One week	20.2	22.1	24.8	16.9	25.1	11.1	21.9
Two weeks	2.7	16.7	17.3	21.1	20.6	13.3	17.4
Three weeks	6.4	8.5	10.6	7.6	7.7	4.5	8.6
Four weeks	.0	6.5	7.1	6.1	4.0	.0	5.9
Five weeks	2.7	2.5	2.2	1.9	.8	.0	2.1
Six weeks or more	3.7	7.3	6.1	6.1	4.9	4.4	6.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean number of days	6.9	12.4	12.5	11.7	10.6	6.9	11.8

Although the youngest and oldest dentists reported the same average length of wait for an appointment, only 17.8 per cent of the dentists in their 70's indicated they did not have as many patients as they would have liked in 1958, compared to 40.2 per cent of the dentists in their 20's (Table 75). Older dentists tended to be satisfied with a relatively small backlog of patients in their appointment books.

An "index of busyness" was developed, using a value of 4 points for dentists who were unable to care for all would-be patients, 3 points for those who felt overworked, 2 points for those who did not feel overworked in caring for all who requested appointments and 1 point for those without enough patients. The index of busyness was highest for dentists in their 40's and 50's (2.6) and lowest for dentists under 30 (1.9). The

Table 75 • Percentage distribution of nonsalaried dentists according to description of practice busyness in 1958, by age

Description of practice busyness	Age						All ages
	–29	30–39	40–49	50–59	60–69	70–	
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	9.8	21.9	22.8	22.6	17.3	13.3	21.1
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked (you felt "overworked").	8.9	21.4	26.1	26.8	16.0	6.7	22.4
You provided dental care for all who requested appointments, and did not feel "overworked."	41.1	37.3	35.5	36.6	48.2	62.2	38.4
You did not have as many patients as you would have liked.	40.2	19.4	15.6	14.0	18.5	17.8	18.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Busyness index	1.9	2.5	2.6	2.6	2.3	2.2	2.5

Table 76 • Percentage distribution of nonsalaried dentists according to average wait for an appointment in 1958, by region

Average wait	New England	Middle East	South-east	South-west	Central	North-west	Far West	United States
One or two days	18.4	24.7	16.5	22.2	16.0	10.7	14.4	18.6
Three to six days	14.0	23.0	21.0	19.6	17.0	14.0	18.5	19.2
One week	22.2	23.8	21.0	24.2	22.0	13.3	20.9	21.9
Two weeks	16.8	12.3	12.8	16.4	21.4	28.0	20.6	17.4
Three weeks	14.6	6.8	8.8	5.2	9.4	11.3	8.2	8.6
Four weeks	7.0	4.2	8.5	5.2	5.5	8.7	6.8	5.9
Five weeks	1.6	.9	2.3	2.6	2.7	2.7	3.0	2.1
Six weeks or more	5.4	4.3	9.1	4.6	6.0	11.3	7.6	6.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean number of days	12.6	9.2	13.1	10.3	12.4	16.2	13.1	11.8

average for all nonsalaried respondents was 2.5.

BUSYNESS ACCORDING TO LOCATION

Of the seven regions, the longest average wait for an appointment was reported by dentists in the Northwest (16.2 days), followed by the Southeast (13.1 days), the Far West (13.1 days), New England (12.6 days), Central (12.4 days), the Southwest (10.3 days) and the Middle East (9.2 days) (Table 76). A waiting period of "one or two days" was reported by 24.7 per cent of the dentists in the Middle East, compared to only 10.7 per cent in the Northwest. "Six weeks or more" was checked by 11.3 per cent of the respondents from

Table 77 • Percentage distribution of nonsalaried dentists according to description of practice busyness in 1958, by region

Description of practice busyness	New England	Middle East	South-east	South-west	Central	North-west	Far West	United States
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	20.1	15.1	28.3	19.5	22.3	27.7	23.4	21.1
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked (you felt "overworked").	22.7	25.3	20.3	24.8	21.1	27.7	17.5	22.4
You provided dental care for all who requested appointments, and did not feel "overworked."	39.7	35.6	36.7	39.6	38.7	34.7	46.0	38.4
You did not have as many patients as you would have liked.	17.5	24.0	14.7	16.1	17.9	9.9	13.1	18.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Busyness index	2.5	2.3	2.6	2.5	2.5	2.7	2.5	2.5

Table 78 • Percentage distribution of nonsalaried dentists according to description of practice busyness in 1958, by size of city

Description of practice busyness	City size											All city sizes
	Under 1,000	1,000–2,500	2,500–5,000	5,000–10,000	10,000–25,000	25,000–50,000	50,000–100,000	100,000–250,000	250,000–500,000	500,000–1,000,000	Over 1,000,000	
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	25.5	23.5	33.3	33.6	27.0	20.9	17.9	24.1	15.8	15.5	8.5	21.1
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked (you felt "overworked").	19.1	25.0	19.3	22.9	16.0	19.6	22.5	17.8	23.5	23.1	32.6	22.4
You provided dental care for all who requested appointments, and did not feel "overworked."	42.6	39.7	33.3	27.9	39.9	37.7	42.4	42.3	37.2	39.0	40.3	38.4
You did not have as many patients as you would have liked.	12.8	11.8	14.1	15.6	17.1	21.8	17.2	15.8	23.5	22.4	18.6	18.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Busyness index	2.6	2.6	2.7	2.7	2.5	2.4	2.4	2.5	2.3	2.3	2.3	2.5

the Northwest, compared to only 4.3 per cent of those from the Middle East.

Regional differences in the "busyness index" were not large. The index ranged from 2.3 for the Middle East to 2.7 for the Northwest (Table 77). The percentage of dentists who were too busy (either were overworked or unable to accommodate all would-be patients) ranged from 40.4 per cent in the Middle East to 55.4 per cent in the Northwest, compared to 43.5 per cent for the entire United States.

By city size, the percentage of dentists considering themselves too busy was 44.6 per cent for places with population of less than 1,000 (Table 78). This figure increased with increasing city size to a high of 56.5 per cent for cities of 5,000 to 10,000, then dropped to about 40 per cent for city-size categories above 25,000. The percentage of dentists not having enough patients was lowest in the four smallest city-size categories. These figures were computed for a few of the largest individual cities, and only 5.6 per cent of the Los Angeles dentists indicated they did not have enough patients, a far lower figure than for other cities or for any city-size category.

BUSYNESS BY TYPE OF PRACTICE

Variation in the average wait for an appointment according to type of practice reflects both inherent differences in the nature of dental specialties and the adequacy of the supply of each type of practitioner. The average wait reported by oral surgeons, whose services are ordinarily emergency in nature, was only 2.5 days (Table 79). At the other extreme were orthodontists, who reported an average wait of 16.5 days.

Only 10.5 per cent of the oral surgeons indicated they were too busy in 1958, compared to 43.5 per cent of all nonsalaried respondents (Table 80). The index of busyness was lowest for oral surgeons (1.9) and highest for pedodontists (2.6).

Table 79 • Average wait for an appointment in 1958, by type of practice

Type of practice	Mean number of days	Median
General practitioner	11.9	One week
Specialist	11.0	One week
Oral surgeon	2.5	One or two days
Orthodontist	16.5	Two weeks
Pedodontist	12.3	One week
Periodontist	10.1	One week
Other specialist	8.3	Three to six days
All types of practice	11.8	One week

COMPARISON WITH EARLIER YEARS

This survey indicates that the average wait for an appointment was only 11.8 days in 1958, compared to 12.8 days in 1955 and 13.6 days in 1952. Despite the declining ratio of dentists to the population, the profession appears to be "keeping ahead" of demand for dental care.

Wording of the responses to the question describing busyness was slightly different in this survey from surveys covering 1955 and 1952. The principal change was in the wording of the third choice among the four responses. In the earlier surveys, it read: "There was a good balance between the number of persons who contacted you for dental care and your ability to provide this care." In the current survey, this response was made more specific: "You provided dental care for all who requested appointments, and did not feel 'overworked.'" The percentage of dentists checking this response dropped from 45.3 per cent for 1955 to 38.4 per cent for 1958. Of these 7 percentage points, 5 went into the two "too busy" categories, and about 2 into the "not enough patients" category. It is believed that the change in percentage distribution of responses resulted mainly

Table 80 • Percentage distribution of nonsalaried dentists according to description of practice busyness in 1958, by type of practice

Description of practice busyness	Type of practice							All types of practice
	General practitioner	Specialist	Oral surgeon	Orthodontist	Pedodontist	Periodontist	Other specialists	
Because of the length of your appointment list, some persons who contacted you for dental care actually obtained this care from another dentist.	21.7	16.4	3.5	49.4	35.5	12.0	14.3	21.1
You provided dental care for all who requested appointments, but you felt more rushed and worked more hours than you would have liked (you felt "overworked").	22.7	17.3	7.0	19.4	6.5	40.0	21.4	22.4
You provided dental care for all who requested appointments, and did not feel "overworked."	37.7	47.0	64.9	44.5	41.9	28.0	42.9	38.4
You did not have as many patients as you would have liked.	17.9	19.3	24.6	16.7	16.1	20.0	21.4	18.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Busyness index	2.5	2.3	1.9	2.4	2.6	2.4	2.3	2.5

from the change in wording of the responses.

Certain changes in the percentage of dentists giving particular responses were too large to be accounted for by the change in wording. The percentage of dentists indicating they did not have as many patients as desired increased significantly in two regions between 1955 and 1958: Central region, from 12.5 per cent to 17.9 per cent, and the Far West, from 9.5 per cent to 13.1 per cent. In four regions the percentage of dentists indicating they were too busy increased by 7 percentage points or more: Northwest, from 41.4 per cent to 55.4 per cent; Southeast, from 36.2 per cent to 48.6 per cent; Southwest, from 36.8 per cent to 44.3 per cent, and Middle East, from 33.5 per cent to 40.4 per cent.

Regionally, the largest changes from 1955 to 1958 in number of days wait required for an appointment occurred in the Far West, with a decrease from 16.0 to 13.1 days, and the Central region, with a decrease from 14.0 to 12.4 days. The largest increase was reported in the Southeast, from 12.0 days in 1955 to 13.1 days in 1958.

The next article in this series will present information on the age and sex distribution of dental patients.

Survey of public attitudes regarding dentures
III. Dentures worn; source of dentures

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

About half (49.1 per cent) of the 6,861 adults returning questionnaires had dentures or bridges (Table 19). The percentage of people wearing dentures or bridges increased with age, from 22.4 per cent for respondents in their 20's to 78.3 per cent for respondents 60 and older. In each age bracket, a greater percentage of the women than of the men reported wearing dentures and bridges. For all ages combined, 50.8 per cent of the women and 47.2 per cent of the men had dentures or bridges.

Regionally, the highest percentage of people wearing dentures or bridges was in New England (52.5 per cent), as shown in Table 20. Other regions above the national average were the Far West (51.6 per cent), the Middle East (50.6 per cent) and the Central region (50.6 per cent). Below the national average were the Northwest (46.7 per cent), Southeast (44.0 per cent) and the Southwest (40.5 per cent).

Ordinarily people do not obtain a complete lower denture before a complete upper. Therefore, the percentage of people wearing a complete upper denture is a close approximation to the percentage wearing one or two complete dentures. The percentage of people wearing a complete lower denture is a close approximation to the percentage wearing two complete dentures. The difference between these two percentages is a close approximation to the percentage of people wearing one complete denture (upper only).

Table 19 • Percentage of respondents wearing dentures or bridges, by age and sex

Age	Male	Female	Both sexes
20–29	19.4	24.0	22.4
30–39	27.9	34.1	31.2
40–49	40.2	48.6	44.6
50–59	57.7	66.0	62.1
60–	76.4	80.3	78.3
No answer	61.4	50.0	55.3
All ages	47.2	50.8	49.1

Complete upper dentures were worn by 31.9 per cent of the respondents and complete lower dentures by 22.4 per cent (Table 21). The percentage of people

Table 20 • Percentage of respondents wearing dentures or bridges, by region and sex

Region	Male	Female	Both sexes
New England	49.1	55.5	52.5
Middle East	48.2	52.7	50.6
Southeast	43.5	44.5	44.0
Southwest	36.8	43.9	40.5
Central	50.2	51.0	50.6
Northwest	38.1	54.0	46.7
Far West	50.0	52.9	51.6
United States	47.2	50.8	49.1

Table 21 • Percentage of respondents wearing specified type and number of dentures and bridges, by age

Age	Number of partial dentures and removable bridges			Number of fixed bridges			Complete upper	Complete lower
	One	Two	Three or more	One	Two	Three or more		
20–29	8.6	1.7	.6	3.0	.5	.4	10.1	4.2
30–39	9.5	1.8	.5	4.8	1.4	.4	14.8	7.8
40–49	11.6	2.4	.2	5.0	1.7	.5	25.6	16.6
50–59	14.9	3.8	.4	3.4	1.6	.1	41.4	29.3
60–	12.7	3.9	.2	1.8	.7	.2	62.5	50.0
No answer	12.8	3.2	.0	4.3	1.1	.0	36.2	19.2
All ages	11.5	2.8	.4	3.7	1.2	.4	31.9	22.4

in their 20's wearing a complete upper denture was 10.1 per cent. This figure increased only moderately to 14.8 per cent for people in their 30's, but increased sharply with each higher age bracket, to 62.5 per cent among people 60 and older.

The ratio of complete lower to complete upper dentures increased with age from .42 for persons in the youngest age bracket to .80 for persons 60 and older.

As shown in Table 22, the Southwest was characterized by a relatively low number of people wearing complete dentures. The ratio of complete lowers to complete uppers was lowest in New England (.62) and the Middle East (.64), and highest in the Northwest (.82) and the Southeast (.80). Therefore, it is not surprising that the percentage of respondents wearing partial dentures and removable bridges was highest in New England (15.7 per cent) and the Middle East (17.5 per cent) and lowest in the Northwest (9.5 per cent) and the Southeast (12.9 per cent). The percentage of respondents with fixed bridges ranged from 3.9 per cent in New England to 6.3 per cent in the Far West.

During the 12 month period preceding the survey, complete upper dentures were received by 3.0 per cent and complete lowers by 2.0 per cent of the respondents. Of the male respondents,

Table 22 • Percentage of respondents wearing specified type and number of dentures and bridges, by region

Region	Number of partial dentures and removable bridges			Number of fixed bridges			Complete upper	Complete lower
	One	Two	Three or more	One	Two	Three or more		
New England	12.0	3.1	.6	3.1	.8	.0	35.2	21.8
Middle East	13.3	3.7	.5	3.5	1.0	.2	31.4	20.1
Southeast	10.0	2.4	.5	3.6	1.1	.5	27.3	22.0
Southwest	10.0	3.9	.2	4.6	.7	.5	24.1	17.7
Central	12.1	2.8	.4	3.7	1.6	.3	33.7	23.0
Northwest	8.4	1.1	.0	3.0	1.1	.3	33.7	27.5
Far West	11.4	2.1	.2	4.3	1.5	.5	35.1	24.6
United States	11.5	2.8	.4	3.7	1.2	.4	31.9	22.4

only 2.7 per cent received complete uppers and 1.8 per cent complete lowers. Comparable figures for women were 3.4 per cent and 2.2 per cent. One or more partial dentures were received by 2.3 per cent and one or more fixed bridges by .8 per cent of all respondents. These figures indicate that the approximately 110 million persons 20 and older received a total of some 5.5 million complete dentures, about 3 million partial dentures and about 1 million fixed bridges, during the year ending in April 1960. (Other sources of information indicate that considerably more than 1 million fixed bridges are placed annually. It seems likely that some respondents did not know the meaning of the term "fixed bridges.")

SOURCE OF DENTURES

Those respondents wearing complete or partial dentures were asked whether their dentures had been obtained from a dentist or from a dental laboratory technician. As shown in Table 23, 93.7 per cent indicated they had obtained their dentures from dentists and 2.1 per cent from dental laboratory technicians. The remaining 4.2 per cent did not indicate the source of their dentures.

The percentage of denture wearers indicating they had obtained their dentures from technicians did not vary significantly by age (Table 23). The percentage of denture wearers failing to give the source of their dentures, however, was highest in the lowest age group (8.8 per cent) and declined with each higher age group to 2.5 per cent for the "60 and older" age group.

By region, the highest percentages of denture wearers having obtained their dentures from technicians were in the Middle East (2.8 per cent) and the Far West (2.7 per cent) (Table 24). At the other extreme were the Northwest (1.3 per cent) and the Central region (1.6 per cent). The statistics on source of denture by family income present no distinct trend (Table 25). Of the men wearing dentures, 2.8 per cent indicated they had received them from technicians, compared to 1.6 per cent for women. In areas classified as "rural," only 1.4 per cent of the respondents had patronized technicians. In metropolitan areas of more than 2,000,000 population, 3.7 per cent of the respondents from the central cities, and 2.8 per cent of the suburbanites, had obtained their dentures from technicians.

The differences in percentage of denture wearers obtaining dentures from technicians according to age, region and

Table 23 • Percentage distribution of respondents wearing complete or partial denture(s) according to source, by age of respondent

Age	Source			Total
	Dentist	Dental laboratory technician	No answer	
20–29	88.7	2.5	8.8	100.0
30–39	91.6	1.3	7.1	100.0
40–49	92.5	2.8	4.7	100.0
50–59	94.6	2.1	3.3	100.0
60–	95.4	2.1	2.5	100.0
No answer	93.9	2.0	4.1	100.0
All ages	93.7	2.1	4.2	100.0

Table 24 • Percentage distribution of respondents wearing complete or partial denture(s) according to source, by region

Region	Source			Total
	Dentist	Dental laboratory technician	No answer	
New England	93.8	1.7	4.5	100.0
Middle East	93.2	2.8	4.0	100.0
Southeast	92.6	1.9	5.5	100.0
Southwest	92.9	1.9	5.2	100.0
Central	94.8	1.6	3.6	100.0
Northwest	92.9	1.3	5.8	100.0
Far West	94.0	2.7	3.3	100.0
United States	93.7	2.1	4.2	100.0

Table 25 • Percentage distribution of respondents wearing complete or partial denture(s) according to source, by family income

Family income	Source			Total
	Dentist	Dental laboratory technician	No answer	
Under $1,000	93.2	2.7	4.1	100.0
$1,000–$1,999	96.2	.7	3.1	100.0
$2,000–$2,999	94.7	1.9	3.4	100.0
$3,000–$3,999	91.3	4.2	4.5	100.0
$4,000–$4,999	93.3	2.4	4.3	100.0
$5,000–$5,999	92.2	3.2	4.6	100.0
$6,000–$6,999	94.1	1.3	4.6	100.0
$7,000–$9,999	94.4	1.2	4.4	100.0
$10,000 and over	92.8	2.5	4.7	100.0
All respondents	93.7	2.1	4.2	100.0

family income, as shown in Tables 23, 24 and 25, are not necessarily significant. Only 65 respondents admitted getting dentures from technicians. When these 65 respondents are spread among six or more categories (such as age) the number in each category becomes very small. The degree of reliability of these percentages is illustrated by the fact that one more respondent receiving a denture from a technician in the "20 to 29" age category would increase the percentage from 2.5 per cent to 3.1 per cent. The tables demonstrate, however, that patronage of dental technicians takes place at all age and income levels and in all regions of the country.

It seems likely that some respondents receiving dentures from technicians would decline to divulge this fact. It seems safe to assume that the 2.1 per cent who admitted receiving dentures from technicians is a lower limit, and that the true figure is somewhat higher.

Respondents wearing dentures were asked why they chose a dentist or a dental laboratory technician. Apparently many respondents interpreted this question to mean "why did you choose one dentist (or technician) over another" rather than "why did you choose a dentist over a technician (or vice versa)." One third of the respondents who had patronized a technician gave "price" as the reason (Table 26). However, the percentage who indicated their technician had a good reputation, or was capable or experienced in making dentures, was nearly as high—30.7 per cent. The latter figure undoubtedly includes some respondents who were giving the reason why they chose one technician over another.

Those respondents who obtained complete upper or complete lower dentures during the preceding 12 months were asked to indicate the cost of the dentures. The average (mean) cost of complete upper dentures obtained from dentists was $104.21, compared to $82.50 for those obtained from technicians. The averages for complete lower dentures were $100.00 and $71.88 for dentures obtained from dentists and dental technicians, respectively. (The averages for dental technicians were based on a small number of replies: 10 replies for complete uppers and eight for complete lowers.)

Nearly everyone who is fitted with a complete denture has some teeth extracted not long before he receives his denture. Few of the technicians who break the law by taking impressions and providing dentures directly to the public go so far as to perform the extractions.

Respondents wearing a complete upper or lower denture were asked who extracted the last remaining teeth in each jaw just before the denture was obtained. Of the 58 respondents wearing complete upper dentures obtained from technicians, six wrote in that extractions had been made by oral surgeons, one wrote in "technician" and the remaining 51 checked "dentist." Of the 42 wearing complete lower dentures obtained from technicians, four wrote in that oral surgeons performed the extractions, one wrote in "technician" and the remaining 37 checked "dentist." It is possible, of course, that some of those checking "dentist" had their teeth extracted by oral surgeons.

Denture wearers were asked "How did you find out about the person from whom you obtained your partial or full plate(s)?" Of the 65 persons who had obtained dentures from technicians, 47 checked "friend," and the remainder were scattered among miscellaneous sources of information such as newspapers, physicians and dentists.

Respondents wearing a complete upper denture were asked "Is this the first full upper plate you have had?" Of the 2,192 respondents wearing a complete upper denture, 649, or 29.6 per cent, answered "no." These respondents were asked "From whom did you get your first full upper plate?" "A dentist" was checked by 633 respondents and "a dental laboratory technician" by eight respondents. The remaining eight did not reply.

The same question was asked of persons wearing a complete lower denture. Of the 1,536 respondents wearing a complete lower denture, 402, or 26.2 per cent, indicated it was not their first lower denture. Of this number, 394 indicated they had obtained their first lower denture from a dentist and four from a dental laboratory technician. The remaining four did not reply.

Table 26 • Percentage of respondents who obtained denture(s) from specified source giving specified reason for choosing that source

Reason	Source	
	Dentist	Dental technician
He pulled my teeth; I was being treated for other dental problems	15.3	.0
He was highly recommended; was capable; knew his business; had a good reputation	12.8	21.5
He was my regular dentist; was family dentist	12.8	.0
No alternative; only dentist in town; illegal to go to technician	10.3	4.6
It's his profession; only professional person with knowledge to do the work	9.2	3.1
Didn't know there was any other place to get them	7.1	.0
Reasonable price; cheaper	1.8	35.4
Makes good dentures; has much experience in making dentures	2.5	9.2
Was relative, friend or neighbor	1.8	9.2
Have always gone to a dentist	2.3	.0
Convenience of location	2.1	1.5
Not elsewhere classified	4.4	16.9
No answer	19.4	6.2

Table 27 • Percentage distribution of respondents according to replies to the question "If you find it necessary to obtain dental plates in the future, from whom do you intend to get them?" by age of respondent

Age	Intended source				Total
	Dentist	Dental laboratory technician	Undecided	No answer	
20–29	95.2	2.2	1.2	1.4	100.0
30–39	95.3	1.0	1.0	2.7	100.0
40–49	92.0	2.1	1.3	4.6	100.0
50–59	91.9	2.6	.8	4.7	100.0
60–	90.6	2.5	1.5	5.4	100.0
No answer	86.2	2.1	3.2	8.5	100.0
All ages	92.8	2.0	1.2	4.0	100.0

All respondents were asked to answer the question "If you find it necessary to obtain dental plates in the future, from whom do you intend to get them?" The percentages for all ages combined were very similar to those for source of dentures already obtained, with 2.0 per cent of all respondents intending to obtain their dentures from technicians (Table 27). "Undecided" was the reply written in by 1.2 per cent. The percentage failing to answer the question was lowest in the youngest age group, contrary to the trend with respect to source of dentures already obtained, as shown in Table 23. Table 27 appears to indicate that more of the older than of the younger people will in the future obtain their dentures from dental laboratory technicians.

The next chapter in this series will present information on the repairs made in dentures.

Council adopts international temperature standard

COUNCIL ON DENTAL RESEARCH

The Council at its December 1960 meeting adopted the internationally accepted standard temperature condition of 23.0 ± 2.0°C. (73.4 ± 3.6°F.) and specified that it be used whenever applicable in American Dental Association specifications. The current specifications which are affected with the sections of the specifications and the previous specified temperatures are shown in the table.

This modification is effective immediately and was made in the interest of

Table • Sections of specifications affected by change

Spec. no.	Specification	Section	Specified temperatures
1	Alloy for amalgam	4.3.1	22±2°C. (71.6±3.6°F.)
3	Impression compound	4.3.1.1	20-25°C. (68-77°F.)
4	Inlay wax	3.5	20-25°C. (68-77°F.)
	(effective July 1961)	4.3.1.1	20-25°C. (68-77°F.)
		4.3.1.2	20-25°C. (68-77°F.)
		4.3.3	20-25°C. (68-77°F.)
8	Zinc phosphate cement	4.3.1	18-24°C. (65-75°F.)
9	Silicate cement	4.3.1	18-24°C. (64-75°F.)
11	Hydrocolloidal impression material	4.3.3	20-25°C. (68-77°F.)
		4.4.5.1	20-25°C. (68-77°F.)
12	Denture base resin	4.3.1.1	23±1°C. (73.4±1.8°F.)
15	Acrylic resin teeth	4.3.1	23±1.1°C. (73.4±2°F.)

consistency and to conform to internationally accepted practice.

The change was recommended by the Specifications Committee of the Dental Materials Group, International Association for Dental Research, which serves as a consultant body to the Council on matters relating to the American Dental Association's specifications for dental materials.

Revision of American Dental Association specifications for packaging cement

COUNCIL ON DENTAL RESEARCH

The Council has adopted a revision of section 5.1 Packaging, of both American Dental Association Specification No. 8 for Dental Zinc Phosphate Cement and Specification No. 9 for Dental Silicate Cement.

Section 5.1 is changed to read as follows:

5.1 Packaging. The material shall be supplied in properly sealed containers made of materials which shall not contaminate or permit contamination of the contents.

This revision is effective immediately and will permit the use of containers other than glass.

The modification was recommended by the Specifications Committee of the Dental Materials Group, International Association for Dental Research, which serves as a consultant body to the Council on matters relating to the Association's specifications for dental materials.

editorials

The dentist-legislator: contributor to public affairs

The profession is indebted to the Council on Legislation of the Association for compiling the following list of dentists who are serving society as members of their respective state legislatures:

Alaska	—Dr. Edgar I. Baggen—House
Connecticut	—Dr. Morris Cohen (D) House
Illinois	—Dr. Edwin E. Dale (R) House
Indiana	—Dr. George W. McDaniel (R) House
Kansas	—Dr. Frank R. Reid (R) Senate
Massachusetts	—Dr. Cornelius J. Murray (R) House
New Mexico	—Dr. Matthew S. Smith—House
New York	—Dr. E. Ogden Bush (R) Senate
North Carolina	—Dr. Dennis Cook (D) Senate
Pennsylvania	—Dr. David M. Boies (D) House
	—Dr. George K. Haudenshield (R) House
	—Dr. Thomas W. King, Jr. (R) House
	—Dr. Ralph A. Marsh (R) House
	—Dr. H. J. Maxwell (D) House
	—Dr. Albert R. Pechan (R) Senate
	—Dr. John E. Whittaker (R) House
Tennessee	—Dr. Ewing J. Threet—Senate
Virginia	—Dr. R. O. Reynolds—House
West Virginia	—Dr. James B. Poindexter (D) House

Not only is the profession indebted to the Council for this information, it is indebted to these nineteen public-spirited fellow-members who are willing to contribute a good share of their time, experience and understanding for the benefit of society.

Time was—and not so many years ago—when a professional man who entered politics was looked upon quizzically by his fellows. "Political doctor" was not an uncommon, although often unwarranted, appellation. The profession at large was not too tolerant of those who forsook the anonymity of private practice for a floodlighted public office. Fortunately for both the public and the profession, that attitude is rapidly changing. As the public, through its governmental representatives, becomes more interested in its health and demands more public health services, more representatives of the health profession will be needed to guide and administer those services in the best interest of society.

Total figures indicating the extent to which the country's many state and local governmental agencies are engaged in public health are not available. The federal government[1] alone is currently appropriating $3,756,000,000 for medical and health activities which represents more than a $500,000,000 increase over appropriations for those purposes during the last fiscal year. Included in the three and three-quarter billion sum is approximately $15,500,000 for dental research activities. To these enormous expenditures must be added the millions of dollars appropriated by the fifty state legislatures and the hundreds of municipalities for health and welfare purposes.

These vast expenditures plainly indicate the public's acceptance of governmental participation in health service measures. There is little reason to believe that this attitude will lessen in the immediate future. On the other hand there is every reason to believe that it will increase. In view of these facts, it is extremely important that more members of the health professions—men and women of integrity—and with a full understanding of the complexities of rendering health care—serve in political bodies.

The nineteen dentists cited by the Council on Legislation are to be commended for contributing of their time and knowledge to the improvement of public affairs. Also to be commended are those dental societies who encourage their qualified members to do likewise.

1. Journal American Medical Association, Nov. 19, 1960, page 28.

Help Wanted: more qualified dental students needed

The concern voiced by dental educators a year ago because of 141 unfilled seats in the freshman classes of the nation's 47 dental schools has partially—but not wholly—subsided. This year's enrollment figures[1] compiled by the Council on Dental Education are a bit more assuring.

During the academic year 1959-60 the country's 47 dental schools enrolled 3,607 freshman students although they were equipped to accommodate 3,748.

By last fall these same 47 schools had increased their facilities to accommodate 3,812 freshmen but accepted only 3,648. Although there are more unfilled places in this year's freshman class than in last, the over-all enrollment actually is up by 41 students. This is not an outstanding increase but it does represent a 2 per cent improvement over 1959-60, which year, incidentally, suffered a decrease of 1 per cent from the year before. The Council on Dental Education reports another encouraging sign. Seventeen per cent more students took the dental aptitude test last fall than in 1959-60. This increase should result in an increase in future freshman enrollment.

Looking back over the past third of a century, the profession can find some satisfaction in what has been accomplished in the dental educational field. During that period the profession raised the standards of dental education to an all-time high; it increased the number of dental schools 20 per cent and it increased the annual output of dental graduates more than 100 per cent from 1,561 in 1930 to 1,757 in 1940, to 2,565 in 1950 and to 3,253 in 1960. Gratifying as these increases are, they are not sufficient to provide the same ratio of dentists to population in the future that has prevailed during the immediate past. The Council on Dental Education estimates that even with the two new dental schools which are now opening and others which are expected to open, the ratio of dentists to population fifteen short years hence will be about 1:2,450 as compared to 1:2,150 at present and 1:2,000 ten years ago.

Fortunately, other factors are emerging in the rendering of dental service which tend to mitigate the effects of this steadily decreasing ratio. The increased use of high speed equipment, for instance, and the increasing employment of auxiliary personnel have helped the average dentist to increase his productivity approximately 29 per cent. However, if the population continues to increase as rapidly as is expected and if public appreciation of good dental health increases as rapidly as is hoped, more than improved technology and more than the use of greater numbers of auxiliaries will be required to provide the type of dental service which tomorrow's public will demand and deserve. What will be needed is more dentists.

The increased interest in a dental career currently shown by students is slight and it may be transient. It can be made greater and it can be made permanent if the profession—dental societies and individual dentists—actively support the recruitment program which the Council on Dental Education and the American Association of Dental Schools now has under way.

1. Page 211, this issue.

news of dentistry

White House Conference on Aging urges fluoridation, wide dental research

A recommendation for fluoridation of public water supplies, a suggestion for sociological studies of why some groups oppose it, and a long list of dental research projects marked for "special emphasis" were some of the results of the recent White House Conference on Aging.

Held January 9-12 in Washington, D. C., the conference drew about 2,700 delegates plus a number of consultants. Participating were about 20 dentists, some as state delegates, others either as members of the National Advisory Committee which planned the conference or as members of the Central Office and Washington staffs of the American Dental Association. The voice of the profession was heard in all discussions relating to subjects of interest to dentistry.

The financing of health costs was discussed by the "Income Maintenance" section, one of 20 sections of the conference. The final reports of all sections, as well as the draft reports of the work groups, are scheduled to be published within 90 days. The final report of the Income Maintenance section will state that "the majority of the delegates [of the section] believe that the social security mechanism should be the basic means of financing health care for the aged." A dissenting report will be issued by a minority of that section's delegates.

The draft report for "Health and Medical Care" lists some 14 principles for health maintenance, among them being the urging of "fluoridation of water supplies as a long-range benefit for the dental health of the aging group of the future."

For the "Research in Gerontology: Medical" section, a considerable portion of the draft report concentrates on the need for dental research. The report recommends "special emphasis" on: "epidemiologic studies of oral diseases in the aging . . . periodontal disease . . . dental caries . . . oral cancer . . . psychologic and physiologic adjustment to aging changes in the oral and facial regions . . . motivation for seeking dental care and maintaining oral health . . . development of adequate portable dental equipment . . . oral manifestations of nutritional deficiencies and metabolic dysfunction . . .

effect of the oral health on nutritional and metabolic states . . . temporomandibular joint and occlusal dysfunction . . . retention and restoration of the residual alveolar ridge . . . erosion, abrasion and attrition of teeth . . . stomatitides . . . and salivary gland dysfunction." The report also asserts that "since the beneficial effect of water fluoridation is a lifelong phenomenon, it is recommended that behavioral scientists focus attention upon the causes of resistance found in some communities toward institution of this public health measure. Preservation of natural teeth in later years is considered highly significant to the well-being of the aged."

At the close of the meeting, Charles H. Patton, Association president, said that although it was too early to evaluate the effect of the conference, he was pleased that speakers had stressed the "importance of dental care. The most realistic approach to solving the problems of the elderly, after all, is for every citizen to participate in a lifelong program of dental care. Such preventive measures as regular visits to the dentist and fluoridation of community water supplies are the finest possible guarantees that a person will enter the later stages of life with sound oral health . . . a vital part of total health."

Speakers heard at the three plenary sessions of the conference included President Eisenhower; Arthur S. Flemming, Secretary of Health, Education, and Welfare, and Rep. John Fogarty (D.-R.I.), who introduced the bill which brought the conference into being.

A sampling of advance registrations indicated that about 12 per cent of the delegates were dentists and physicians. The percentages of other categories were as follows: educators, 15 per cent; social workers, 15 per cent; businessmen, 10 per cent; clergymen or representatives of religious organizations, 8 per cent; representatives of health organizations, 6 per cent, and labor unions, 5 per cent. The remaining 29 per cent of delegates included retired persons and state delegates of varied occupations.

In the "Health and Medical Care" section, more than 60 per cent were members of the dental or medical professions, or representatives of health organizations.

In the "Income Maintenance" section, about 37 per cent of the delegates were from labor organizations, 28 per cent were dentists or physicians, and 22 per cent were insurance business representatives.

Association Affairs

ASSOCIATION OFFICIALS MEET WITH A. A. RIBICOFF

Officers and staff members of the American Dental Association met January 12 with Abraham A. Ribicoff, governor of Connecticut and secretary-designate of Health, Education, and Welfare in the Kennedy cabinet. The meeting was held in Washington, D. C., where Association representatives were attending the White House Conference on Aging. President Charles H. Patton said the breakfast meeting was a "courtesy call" on the governor and that dental needs of the public were discussed informally.

Among matters discussed, said Dr. Patton, were the enactment of a federal grant program to help in the construction of new dental schools and the remodeling and expansion of existing schools, and a federal grant-in-aid program to provide matching funds for state dental public health programs and more effective public dental health programs at the community level.

Dr. Patton said that Association representatives pledged the profession's fullest possible cooperation to Ribicoff as he takes up his duties. "The leadership of

Association officials meet with secretary-designate of Health, Education and Welfare. Left to right: Charles H. Patton, president of the American Dental Association; C. Willard Camalier, assistant secretary of the Association; Abraham A. Ribicoff, secretary-designate of Health, Education and Welfare, and Harold Hillenbrand, Association secretary.

the health professions must be progressive and realistic," he said, "if a way is to be found to guarantee the best care to all Americans."

In addition to the Association president, others at the meeting were: Harold Hillenbrand, secretary; C. Willard Camalier and Mr. Bernard J. Conway, assistant secretaries, and Mr. Hal M. Christensen of the Association's Washington office.

DENTAL ABSTRACTS TO RUN ORIGINAL ARTICLE MONTHLY

With its February issue, DENTAL ABSTRACTS initiates a new policy of running each month a feature article presenting current material on a subject of interest to all dentists. Most feature articles will be original studies written for DENTAL ABSTRACTS; occasionally, the magazine may carry an outstanding review article on a dental subject, which has appeared in a journal not available to most dentists.

"Principles in radiation hygiene and their application to dentistry" is the title of the February feature article. The author is Seymour H. Yale, professor and head of the department of radiology, College of Dentistry, University of Illinois, Chicago. Professor Yale evaluates the current literature pertinent to radiation hazards in dentistry, and analyzes the responsibility of the dentist in maintaining effective radiation hygiene in clinical practice.

Among outstanding abstracts in the February issue is one of an article by Max M. Weinreb, presenting histologic evidence of a union between the gingival epithelium and the hard tooth surface. Henry C. Sandler and S. Sigmund Stahl discuss prevalence of periodontal disease in a hospitalized population. Benito B. Rish describes experiments with alloplastic material in the correction of receding chins. He lists step-by-step instructions for the oral surgical operation. A Canadian dentist, D. J. Yeo, lists advantages of the air turbine handpiece in dentistry for children. New concepts of light levels of anesthesia are discussed by Ben Sheiner. Use of "button" syringes to avoid needle breakage during mandibular anesthesia is discussed by a German dentist. A Danish dentist relates experiences with a hydrocortisone spray in the treatment of oral lesions. Henry K. Beecher,

of the Harvard Medical Schools, tells of 13 studies in which it was discovered that the effectiveness of placebos in relieving pathological pain is over ten times that found in relief of experimental pain.

A yearly subscription to DENTAL ABSTRACTS is $8 in the United States, $9 abroad. Subscriptions may be sent to the subscription department, American Dental Association, 222 E. Superior St., Chicago 11, Ill.

JOURNALISM CONFERENCE SET FOR CHICAGO, MARCH 13, 14

The 1961 conference on dental journalism will be held March 13 and 14, in the Central Office of the American Dental Association, it is announced jointly by Isaac Sissman, chairman of the Association's Council on Journalism, and Miss Belle Fiedler, president, American Association of Dental Editors.

Participants will divide into six workshop groups devoted to consideration of format, scientific articles, book reviews and abstracts, news, editorials and advertising. Arthur Snider, science editor of the *Chicago Daily News,* will address a luncheon session March 14 in the Hotel Pearson.

BUREAU PUBLISHES BOOKLET ON 'FOLKLORE AND FALLACIES'

A new six-page leaflet entitled "Folklore and Fallacies in Dentistry" has been produced by the Association's Bureau of Dental Health Education. Because it refutes many common false ideas, the booklet is excellent to distribute at P.T.A. meetings and county and health fairs and for dentists to give to new patients.

Prices are: (25) $0.75; (50) $1.25; (100) $2.25; (500) $10. Prices for larger quantities can be obtained on request from the Order Department of the Association, 222 E. Superior St., Chicago 11.

Velma M. Child

MRS. VELMA CHILD HONORED FOR 25 YEARS OF SERVICE

Mrs. Velma Child, secretary of the Association's Council on Journalism, was honored December 23 for her quarter century of service to the American Dental Association. The brief ceremony took place at the annual Christmas party in the Central Office.

When Mrs. Child joined the Association staff in 1935, she recalled, the headquarters were in a private residence at 212 E. Superior St., two doors west of the Association's present home at 222 E. Superior St. In 1935 the Central Office staff consisted of 17 persons, serving a membership of about 38,000 dentists. Today, the staff numbers more than 200 and the membership has soared to 96,203.

Mrs. Child listed the growth of the Association and the expansion of services to members as high points of her years with the organization. With the exception of her first year, Mrs. Child has worked with Lon W. Morrey, now editor-in-chief. She was his secretary when he was the Association's first director of public relations activities, and later she became production manager for the Association's scientific publications when Dr. Morrey was appointed editor.

Mrs. Child studied journalism at the Chicago campus of Northwestern U.

HAL CHRISTENSEN JOINS WASHINGTON OFFICE STAFF

Mr. Hal Christensen, formerly secretary of the Council on Legislation at the Association's Central Office in Chicago, joined the staff of the Washington office last month. Acting temporarily as secretary of the Council is Mr. Bernard J. Conway, assistant Association secretary for Legal Affairs, and secretary of the Judicial Council.

TAYLOR T. HICKS NAMED TO DENTAL EXAMINERS' COUNCIL

Taylor T. Hicks, Prescott, Ariz., has been appointed a member of the Council of National Board of Dental Examiners to succeed Roger K. Trueblood, resigned. In announcing the appointment, President Charles H. Patton of the American Dental Association said that Dr. Hicks had been appointed for the ad interim term to end with the 1961 annual session, at which time the House of Delegates will elect a person for the new term ending in 1964.

Dental Societies

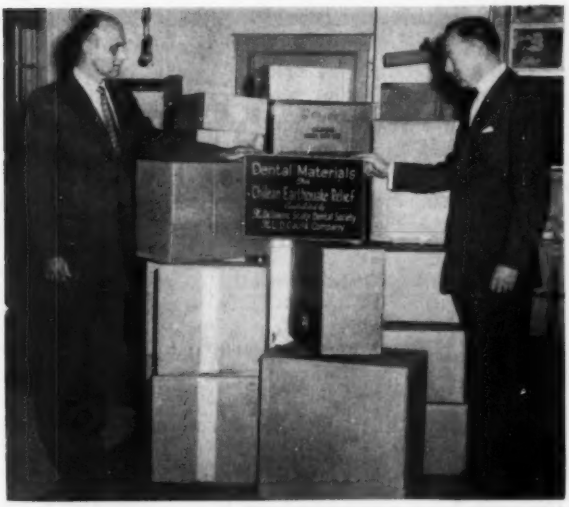
SOUTHERN CALIFORNIA JOINS STATE DENTAL SERVICE

The Southern California State Dental Association announced in December that, after discussion with the California Dental Association, it had voted to join the California Dental Association Service, a corporation which administers dental care programs. Carlton H. Williams, chairman of the special dental care committee of the Southern California State Dental Association, hailed the concept of one dental service for the entire state, with equal representation from both sections.

On January 16, C. Edward Rutledge, president of the California Dental Association Service, announced completion of arrangements for the first of two adult group dental care programs between his organization and trustees of the Hotel, Motel, and Restaurant Culinary Workers Insurance Trust Fund, representing the culinary workers and bartenders of Santa Clara, and of Riverside, Imperial and San Bernardino counties, the so-called Tri-County group of Southern California. The Santa Clara County group consists of 4,000 members, and the Tri-County group of 1,400 members. No dependents of either group are involved.

The plan, the first in California, will enable patients to go to their own dentist or to the dentist of their choice, Dr. Rutledge said. Seventy-five per cent of the cost will be paid by C.D.A.S., and 25 per cent by the patient. The two-year contract provides relatively complete dental health care.

The new home of the Tennessee State Dental Association, at 210 Twenty-third Ave., N., Nashville, represents the successful culmination of a program launched in 1957 by J. C. McGuffin in his presidential address. The eight-room brick building is on a lot measuring 60 by 150 feet. The property was purchsed in 1958 and rehabilitated by a committee headed by Charles F. Pearson



Charles F. Moore, president of the Delaware State Dental Society (right) and William Lankford, treasurer, L. D. Caulk Co., Milford, Del., with dental materials and supplies collected in Delaware and sent to the distressed dentists in Chile.

SUPPLIES FROM DELAWARE FOR STRICKEN CHILEAN DENTISTS

Members of the Delaware State Dental Society, with the generous aid and contribution of the L. D. Caulk Co. in Milford, have collected dental supplies and equipment valued at $20,000 and sent them to aid the dentists of Chile. Hundreds of dentists in Chile had their offices destroyed in the recent earthquake.

The supplies were packaged by the Caulk Co. and sent to the American National Red Cross for shipment to Chile.

In a letter to the president of the Chilean Dental Society, Charles F. Moore, president of the Delaware State Dental Society, said in part: "It is our most sincere desire that these goods help in the dental rehabilitation of the population in Southern Chile, and that they contribute to complete the stock of each dental office, be it private or public.

"The colleagues who practice in the State of Delaware, and the Caulk Company, deeply feel the tragic happenings that afflicted so large an area of the Republic of Chile, but they are optimistic in feeling that there will be a great renaissance throughout the area, not only in things material but in the profession itself."

R. E. L. MILLER, 90, STILL PRACTICING DENTISTRY

Robert Edward Lee Miller, 90, easily qualifies as the oldest member of the Northern Virginia Dental Study Club. A graduate of the University College of Medicine in Richmond, Va., Dr. Miller served as assistant to the dean of the dental school for two and one-half years

R. E. L. Miller

after his graduation. Dr. Miller, still engaged in general practice in Huntington, W. Va., is a life member of the Virginia State Dental Association, Northern Virginia Dental Study Club, and the Shenandoah Valley Dental Association, Component #7. His son, Dr. Miller, Jr., is a member of the Virginia State Board of Dental Examiners.

WISCONSIN SOCIETY NAMES WHITE AS FIELD SECRETARY

George J. White has been appointed to the newly created position of field secretary of the Wisconsin State Dental Society, Kenneth F. Crane, executive secretary, announces. As field secretary, Mr. White, 38, will coordinate the activities of the Commission on Dental Health, primarily in the field of dental health education, and will develop programs designed to advance the status of dentistry in Wisconsin. His headquarters will be in the executive office, 704 W. Wisconsin Ave., Milwaukee 3.

Born at Harvey, Ill., in 1923, and educated at Whitewater State College and North Carolina State College, Mr. White for the past seven years has served as executive secretary of the Chamber of Commerce at Beaver Dam, Wis.

CHARLES B. BOLTON HONORED BY CLEVELAND DENTAL UNIT

In recognition of outstanding contributions to the arts, science and literature of dentistry, Mr. Charles B. Bolton was given an honorary membership in the Cleveland Dental Society at the December meeting of the group.

Congresswoman Frances P. Bolton, Mr. Bolton's mother, was the first lay person to be made an honorary member of the Cleveland society. In 1929 she established the Bolton Fund to finance research started in 1925 by B. Holly Broadbent at the Western Reserve University School of Medicine. The fund, one of the largest privately endowed researches in dentistry, is headed by

Mr. Charles B. Bolton, right, was made an honorary member of the Cleveland Dental Society recently. Seen with him, from the left, are: Wylie F. Schultz, chairman, honorary membership committee; B. Holly Broadbent, Sr., and Henry F. Kelly, president of the Cleveland Dental Society.

Mr. Bolton. Dr. Broadbent, clinical professor of dental facial anatomy in the Western Reserve medical and dental schools, is director of this program of dentofacial morphological study.

Mr. Bolton is an Honorary Fellow of the American College of Dentists and of the American Association of Orthodontists.

Dental Education

INTERNSHIP AVAILABLE AT BALTIMORE HOSPITAL

The Children's Hospital, 3825 Greenspring Ave., Baltimore 11, is accepting applications for a full-time rotating internship to begin July 1. The program will stress dentistry for the handicapped and the use of general anesthesia in complete dental service. It will be given with the cooperation of the Department of Pediatrics of the Johns Hopkins Hospital and is being supported by the United Cerebral Palsy Association.

The hospital has applied to the Council on Dental Education of the American Dental Association for approval of this training program. Further information can be obtained by writing to Mr. C. Christiansen, administrator, Children's Hospital.

INDIANA DENTAL SCHOOL SETS DATES FOR 3 SYMPOSIUMS

Three symposiums have been planned by the Indiana University School of Dentistry to take place during the next three months.

Foreign graduate students who are engaged in research projects of interest to the profession in Indiana will present papers reporting their projects and summarizing the results at a symposium on February 22.

On March 15 a symposium for dental technicians will be presented. Although designed primarily for the laboratory technician, the speakers—dentists and representatives from laboratories—will present much which will interest the practicing dentist.

The third session is entitled "Dentistry for the Adolescent," and will be held April 19. This program will be built around two lectures by Cosmo Castaldi of the Faculty of Dentistry, University of Alberta, Edmonton, Canada, formerly of Indiana University.

There is no fee for any of the symposiums. Further information can be obtained by writing to: Dean, Indiana University School of Dentistry, 1121 W. Michigan St., Indianapolis 2.

FUND FOR DENTAL EDUCATION OFFERS FOUR FELLOWSHIPS

Four teaching fellowships paying a stipend of $3,600 to $5,000 will be available from the Fund for Dental Education during 1961 to persons wishing to prepare themselves for careers in dental education, Maynard K. Hine, president of the Fund, has announced.

Application for these fellowships can be made on forms secured from dental school deans or directly from the Fund office at 840 N. Lake Shore Dr., Chicago 11.

With the addition of two fellowships recently established, the following awards are available to dentists or dental seniors planning to enter dental teaching: the American Dental Association Teaching Fellowship of $5,000 which is sponsored by The Great-West Life Assurance Company; the American Dental Trade Association Teaching Fellowship of $3,600, and two Fund for Dental Education Teaching Fellowships of $3,600 each.

Applicants must be graduates of den-

tal schools in the United States or Canada and must be prepared to submit academic records showing they are qualified to enroll in graduate dental education programs. Applicants are required to sign a statement indicating they expect to become dental teachers on completion of the fellowship training.

GRANT TO IDAHO STATE FOR COURSE IN DENTAL HYGIENE

Idaho State College has received a $99,950 grant from the W. K. Kellogg Foundation to develop a two-year course in dental hygiene. The grant will cover 100 per cent of the direct net operating expenses of the curriculum for the first two years and 50 per cent of the third year's expenses, according to Laurence E. Gale, dean of pharmacy and chairman of the division of medical arts. Both liberal arts and dental hygiene subjects will be included in the two-year course, designed to prepare students for state licensing as dental hygienists. The program, which will join nursing and pharmacy in the division of medical arts, is expected to start in September.

SANTA FE DENTIST NAMED TO SCHOLARSHIP COMMITTEE

Ralph R. Lopez, chairman of the legislative committee of the New Mexico Dental Association, has been named to the Committee on Scholarship Studies for the Association of Governing Boards of State Universities and Allied Institutions.

Dr. Lopez long has been active in affairs concerning higher education in New Mexico and is a member of the University of New Mexico Board of Regents.

He has been asked to take part in a nationwide survey of the scholarship situation with the committee as part of a move to make more such grants available to youths who otherwise would not be able to attain a higher education.

TRAINEESHIPS AVAILABLE AT UNIVERSITY OF ILLINOIS

The College of Dentistry and the Graduate College of the University of Illinois have announced a graduate program in the field of oral histology and biology for qualified postdoctoral trainees who wish to prepare themselves for a career in dental teaching and research.

Advanced instruction is available in the fields of embryology, histology, histochemistry and submicroscopic morphology of the oral tissues.

Annual stipends provided by the Division of General Medical Sciences of the National Institutes of Health are $4,500 plus allowances for dependents. Further information can be obtained by writing to the dean of the College of Dentistry, University of Illinois, 808 S. Wood St., Chicago 12.

TACOMA HOSPITAL OFFERS ROTATING INTERNSHIP

A one-year rotating dental internship is available at the Mountain View General Hospital, Tacoma, Wash., beginning July 1. Approval of this program by the Council on Dental Education of the American Dental Association is pending.

Application forms and a brochure can be secured by writing to the chief of dental services at the hospital, 3500 Pacific Ave., Tacoma 8.

PROSTHODONTICS RESIDENCY AT WOOD, WIS., HOSPITAL

Wood Veterans Administration Hospital Center, Wood, Milwaukee, has a two-year residency program in prosthodontics which is affiliated with Marquette University School of Dentistry. Application forms and further information concerning the program which begins July 1 can be obtained by writing to the manager of the center, Milwaukee, Wis.

ORTHODONTIC, PEDODONTIC TEACHER TRAINING PROGRAM

The National Institute of Dental Research has made available to the University of North Carolina School of Dentistry a graduate training grant effective July 1 for the purpose of training teachers in orthodontics or pedodontics.

A degree of Master of Science, or a Master of Science in Orthodontics or in Pedodontics, will be granted by the graduate school on the successful completion of the appropriate curriculum. The former subject requires 19 months in residency and the latter 24 months. A stipend of $5,000 plus a modest travel allowance is available for each successful candidate.

Applications must be submitted by April 1 for classes beginning June 8. Forms and additional information can be obtained by writing to L. B. Higley, University of North Carolina School of Dentistry, Drawer 750, Chapel Hill.

GRADUATE STUDY COURSES AT UNIVERSITY OF PITTSBURGH

Selection of participants for the fall, 1961, session in the graduate division of the University of Pittsburgh School of Dentistry will be made in March. Applications are now being accepted for graduate study in the fields of anesthesiology, oral surgery, orthodontics, periodontics and prosthodontics. These courses will lead to the Master of Science degree.

A nondegree, full-time, 12 month course in general anesthesia is also available for qualified dental graduates.

Graduate study in the preclinical basic sciences of anatomy, biochemistry, microbiology, pathology, pharmacology and physiology leading to the Master of Science or Doctor of Philosophy degrees is also offered through the Schools of the Health Professions. Successful applicants in this latter program are eligible for financial assistance in the form of traineeships.

Further information and application forms can be obtained by writing to the Director of Graduate Education, University of Pittsburgh, School of Dentistry, Pittsburgh 13.

FUND FOR DENTAL EDUCATION RE-ELECTS HINE, THORNTON

Maynard K. Hine and Mr. Henry M. Thornton were re-elected at the annual meeting of the trustees of the Fund for Dental Education to serve five-year terms as members of the board of directors. Dr. Hine is dean of the School of Dentistry, Indiana University, and a Trustee of the American Dental Association. Mr. Thornton is president of Dentists' Supply Co., York, Pa., and president of the American Dental Trade Association.

At a meeting of the directors of the fund, the following officers were elected to one-year terms: President, Dr. Hine; vice-president, Raymond J. Nagle, and secretary-treasurer, G. Willard King. Dr. Nagle is dean of the College of Dentistry, New York University, and president of the American Association of Dental Schools.

RESIDENCY, INTERN, RESEARCH PROGRAM AT U. OF ROCHESTER

The University of Rochester School of Medicine and Dentistry has openings in its program of graduate work and research in the dental sciences and also invites applicants to apply for a residency in oral surgery (chief), an assistant residency in oral surgery and two rotating internships at Strong Memorial Hospital.

Stipends for the Fellowships in dental research start at $4,500 per year with additional allowance for dependents. Further information can be secured from Erling Johansen, chairman, Department of Dentistry and Dental Research, University of Rochester, School of Medicine

and Dentistry, Rochester 20, N. Y.

Application forms for the residencies and internships can be secured by writing to Strong Memorial Hospital, 260 Crittenden Blvd., Rochester 20.

SEMINAR SCHEDULED ON DENTISTRY FOR HANDICAPPED

The Academy of Dentistry for the Handicapped has planned a tuition-free seminar on office management of the handicapped patient to be held Sunday afternoon, February 5, at the Conrad Hilton Hotel, Chicago. The faculty includes M. Michael Cohen, Max Sadove, Robert Kaplan, Max L. Bramer and Arnold Steinberg. The seminar is open to all dentists.

LYONS AND BURKET VISIT DENTAL SCHOOL IN JERUSALEM

Harry Lyons, dean of the Medical College of Virginia School of Dentistry and a past president of the American Dental Association, and Lester W. Burket, dean of the University of Pennsylvania School of Dentistry, recently spent two weeks in Jerusalem as consultants to the Hebrew University. Their mission included an evaluation of the dental school of Hebrew University, an appraisal of dental manpower in Israel, and the preparation of recommendations to guide the further development of dental education in that country.

En route to the Near East, Deans Burket and Lyons visited Athens and the dental school of the University of Athens.

ORAL PATHOLOGY FELLOWSHIP OPEN AT U. OF PENNSYLVANIA

Applications are being accepted for a clinical fellowship in oral pathology at the University of Pennsylvania dental school, beginning July 1. The one-year fellowship, supported by the American Cancer Society, is open to United States citizens who are graduates of a U. S. dental school.

A stipend of $3,600 (tax free) accompanies the program which is planned to suit the specific needs and interests of the successful applicant.

A curriculum vitae and letters of reference can be submitted to C. E. Wilde, Jr., Department of Pathology, School of Dentistry, University of Pennsylvania, 4001 Spruce St., Philadelphia 4.

PITTSBURGH HOSPITAL HAS INTERN, RESIDENCY PROGRAM

The Veterans Administration Hospital, Leech Farm Road, Pittsburgh 6, announces that it is accepting applications for its one-year rotating dental internship program, beginning July 1, and for its two-year prosthodontics residency program, also starting July 1. Information and application forms can be obtained from the chief of the dental service of the hospital.

TWO V.A. HOSPITALS HAVE INTERNSHIP VACANCIES

Veterans Administration hospitals in Kansas City, Mo., and Oakland, Calif., have two rotating internships available to begin July 1. Information regarding these programs can be obtained by writing to the former hospital at 4801 Linwood Blvd., Kansas City 28, and to the latter at Thirteenth and Harrison Sts., Oakland 12.

ROTATING INTERNSHIP AT BALTIMORE HOSPITAL

The Children's Hospital of Baltimore is accepting applications for a full-time dental internship to begin July 1. The internship is of the rotating variety and

will stress dentistry for the handicapped and the use of general anesthesia in complete dental service. The training will be given with the cooperation of the department of pediatrics of Johns Hopkins Hospital. Inquiries should be addressed to Mr. Christian M. Christiansen, administrator of the hospital, 3825 Greenspring Ave., Baltimore 11.

REFRESHER COURSES SCHEDULED BY MANY SCHOOLS THIS YEAR

Alabama • The University of Alabama School of Dentistry will offer three courses in May: pedodontics for the general practitioner, May 6-7, Sidney B. Finn; root canal therapy, May 10-12, Adeeb E. Thomas, and surgical anatomy of the head and neck, May 22-24, Harry Sicher.

Baylor • The division of graduate studies, Baylor University College of Dentistry, has scheduled two advanced courses of study in periodontology, beginning in September. The first is a nine-month course of postgraduate study leading to the degree of Bachelor of Science in Dentistry, and the second is a 20-month course which leads to the Master of Science in Dentistry degree. Further information can be obtained from the Registrar, 800 Hall St., Dallas 10.

California • A general review course in dentistry will be offered by the Dental Program, University of California Extension, starting April 24 and continuing for eight weeks ending June 23. Didactic lectures will be given in anatomy, anesthesia, biochemistry, organic and inorganic chemistry, crown and bridgework, dental materials, histology, materia medica, metallurgy, operative dentistry, orthodontics, oral diagnosis, oral surgery, pathology, pedodontics, prosthetics, physiology, roentgenology and therapeutics. All applications must be submitted prior to April 3, and the class is limited to ten dentists. March 10-12, Peter K. Thomas will conduct a course on solving some of the problems of full mouth rehabilitation.

Further information may be obtained from J. Eugene Ziegler, Extension Dental Program, University of California Extension, 815 S. Hill St., Los Angeles 14.

Illinois • The University of Illinois College of Dentistry will offer a one-week postgraduate course in dentistry for children March 20-24, directed by Thomas K. Barber, associate professor of pedodontics. Designed for the general practitioner, it will include introduction of children to the dental situation, restorative technics, caries control, pulp therapy, traumatized teeth, oral surgery, demonstration of hospital procedures and a brief discussion of interceptive orthodontics. Enrollment is limited. Applications may be obtained from the Division of Postgraduate Education, University of Illinois College of Dentistry, 808 S. Wood St., Chicago 12.

Michigan • W. K. Kellogg Foundation Institute: Graduate and Postgraduate Dentistry, The University of Michigan, schedules the following postgraduate courses during April, May and June: control of apprehension and pain in dentistry for children—a course for the family dentist, April 17-18; dental radiology, April 17-21; operative dentistry, April 17-28; partial denture prosthesis, April 17-28; oral diagnosis and treatment, April 24-28; practice administration for the pedodontist, May 1-2; hydrocolloid and rubber base inlay technics, May 1-3; complete denture prosthesis, May 8-19; crown and bridge prosthesis, May 8-19; endodontics, May 8-19; minor oral surgery, May 8-19; higher speeds for rotating instruments, May 11-12; amalgam restorations, May 15-17; radiography for dental hygienists, May 15-17; silicate restorations, May 18-19; dentistry for children, May 22-June 2; periodontics, May 22-June 2. A brochure containing detailed information is available from the office of Dr. William R. Mann, Associate Director of the Institute, Ann Arbor.

Norfolk General Hospital's Department of Dentistry is accepting applications for a mixed internship, with emphasis on oral surgery and periodontics, beginning July 1.

Applications should be addressed to Thomas G. Warrick, secretary, Department of Dentistry, Norfolk General Hospital, Raleigh Ave., Norfolk, Va.

Pennsylvania • Postgraduate courses at the University of Pennsylvania School of Dentistry have been set for the following dates: diagnosis and treatment planning, March 6-10, Lester W. Burket, Alvin L. Morris and Roy T. Durocher; practical and simplified procedures in crown and bridge prosthesis, March 13-17, Charles B. Sceia; complete denture prosthesis, Vincent R. Trappozzano, March 27-30; endodontics, Louis I. Grossman and associates, April 10-21; minor tooth movement and tem-

porary stabilization, April 12-14, Leonard Hirschfeld. For further information write—Postgraduate Courses, 4001 Spruce St., Philadelphia 4.

Temple • Temple University School of Dentistry's postgraduate program for this year includes closed circuit television and high speed equipment. Courses have been scheduled as follows: high speed in operative dentistry, Carlos Weil and Charles A. Nagle, Jr., March 1; electronic electrosurgery, Maurice J. Oringer, March 3-4; immediate surgical endodontics, Leonard Parris, Harold Rappaport and Robert Uchin, March 6-11; advanced surgical technics in periodontal therapy, Saul Schluger and Jack Alloy, March 25-29; full denture prosthesis, Bernard Jankelson, May 8-12. Inquiries can be directed to the Postgraduate Division, Broad above Allegheny Ave., Philadelphia 40.

Texas • The University of Texas Dental Branch announces a postgraduate course in pedodontics March 20-22 at the Texas Medical Center in Houston. Richard E. Jennings will direct the study. Ralph E. McDonald, Indiana University School of Dentistry, will be the visiting lecturer, and Dr. Irvin A. Kraft, Texas Children's Hospital, will be a guest speaker. Additional information may be obtained from Director, P.O. Box 20068, Houston 25.

Tufts • Tufts University School of Dental Medicine, Division of Graduate and Postgraduate studies, will offer these postgraduate courses over the next several weeks: orthodontic principles of interest to the general practitioner, each Wednesday for eight weeks, February 8-April 5; minor oral surgery, each Wednesday for six sessions, March 1, 8, 22, 29, April 5 and 12; hypnosis and its clinical applications, March 16-22; endodontics for the general practitioner, March 20-23; partial denture design and construction, March 23-24; participation course in periodontology, April 24-28; clinical adjustment of the occlusion, May 3-5; surgical management of skeletal deformities, May 8-10. Information regarding the courses may be obtained from the Director, 136 Harrison Ave., Boston 11.

Washington • The University of Washington School of Dentistry, Department of Postgraduate Dental Education, will present a television refresher course in practical root canal therapy March 14-17 with John I. Ingle, Dudley H. Glick and Bernard J. Zeldow instructing. Enrollment is limited to 20 and participants will be selected on a geographical basis. March 16-18 a refresher course in dental ceramics will be presented under the direction of William H. (Bert) Hagen. Enrollment for this course will be limited to eight. Those wishing additional information may write the School of Dentistry, Seattle.

Research

DENTAL RESEARCH SYMPOSIUM SCHEDULED AT BOSTON

Approximately 300 papers will be delivered at the thirty-ninth annual meeting of the International Association for Dental Research to be held March 23-26 at Boston. The program will include such topics as dental caries (both human and animal), properties of enamel and dentin, wound healing, microbiology, nutrition and metabolism, and salivary studies.

The Dental Materials Group, composed of IADR members whose chief research interest is improvement of materials used in dentistry, will meet concurrently. About 50 research papers will be presented.

For the first time in the association's history, commercial exhibits will be a part of the 1961 meeting under supervision of the IADR and the American Association of Dental Schools, which meets March 26-29.

PAPERS AVAILABLE FROM SESSION ON P. G. PROGRAMS

Approximately 100 prominent figures in the fields of dental education and research gathered at Western Reserve University on July 18 and 19 to discuss graduate training programs in the basic sciences and clinical dentistry. A limited number of copies of the discourses presented at this meeting are available to dental schools and others interested in graduate dental education.

A mounting shortage of dental teachers and researchers in the afore-mentioned fields was recently confirmed in studies by the American Dental Association and by special consultants to the U. S. Congress.

Delegates to the conference, sponsored by the National Institute of Dental Research, included the directors of graduate training centers, established by Public Health Service grants in 1957, which are now in operation at 29 dental schools throughout the country.

Requests for copies of the papers at the second biennial conference of graduate training program directors can be made to the chief of extramural programs, National Institute of Dental Research, Norfolk building, Bethesda 14, Md.

Public Health

DIPLOMATES NAMED BY BOARD OF DENTAL PUBLIC HEALTH

The following persons have been certified as Diplomates of the American Board of Dental Public Health as a result of the certifying examination given at the School of Dentistry, University of Southern California, October 13 and 14:

Thomas J. Beare, Berkeley, Calif.; Viron L. Diefenbach, Denver; John W. Stone, Knoxville, Tenn., and W. W. Westmoreland, Berkeley, Calif.

The Board will hold its next certifying examination on October 12 and 13, 1961, in Philadelphia, in conjunction with the one-hundred and second annual session of the American Dental Association. Candidates for this examination must submit their applications to the secretary of the Board not later than June 15.

Information and application forms can be obtained from the secretary, Donald J. Galagan, Division of Dental Public Health and Resources, Public Health Service, Department of Health, Education, and Welfare, Washington 25, D. C.

Officers and a new member of the Board elected in Los Angeles are: president, Chester V. Tossy; vice-president, John T. Fulton; secretary-treasurer, Donald J. Galagan, and member, Polly Ayers (to succeed Robert A. Downs).

FLUORIDATION SUIT IS WITHDRAWN IN MICHIGAN

A plaintiff in Highland Park, Mich., who in 1956 had filed suit claiming she had suffered an allergic reaction from fluorides in the local water supply, withdrew her suit when the case was scheduled for trial January 3.

Harold Hillenbrand, secretary of the American Dental Association, hailed the action as "a significant victory for fluoridation." He said the suit was withdrawn because "it became obvious to the plaintiff that she could not prove any injury resulting from fluoridation." Medical and dental literature reveals no sound basis for such a claim, said Secretary Hillenbrand. He conjectured that a major factor in the plaintiff's decision to withdraw was that the defendant—the city of Highland Park—had lined up an impressive array of dentists and physicians to testify as to the safety of fluoridation.

The plaintiff, Mrs. Margaret E. Jones, is a patient of Dr. George L. Waldbott, Detroit allergist.

National Defense

ALL SENIOR DENTAL STUDENTS GET PRE-INDUCTION NOTICE

The Association's Council on Federal Dental Services has learned that the Department of Defense has asked the Selective Service System to order for pre-induction processing all senior dental students. This action was necessitated by

the failure of a sufficient number of seniors to volunteer to enter the Armed Forces on graduation to complete their military obligations.

The estimated Armed Forces requirement for dental officer replacements for the fiscal year beginning July 1 is 1,370, distributed about as follows: Army, 570; Air Force, 440, and Navy, 360. (It is not anticipated that the Navy will experience any difficulty in meeting its replacement requirement because 300 seniors are contractually committed to enter active service through their participation in the Ensign 1925 Program.) The Army and Air Force, however, appear to face a combined shortage of at least 500 dentists. Unless this anticipated shortage can be overcome within the next 60 days, through an increase in volunteers, the Department of Defense will be obliged to request the Selective Service System to order the induction of dentists. This would be the first such induction call since 1955. Should a dentist draft become necessary, the point of concentration will be the 1961 dental graduating class.

The American Dental Association is cooperating with the Department of Defense and the deans of the dental schools in an effort to convince senior students of the advantages of volunteering for service with the Armed Forces now, rather than of waiting an indeterminate time for an involuntary call to duty.

CONGRESSMAN FOGARTY GIVEN HONORS MEDAL BY FRATERNITY

Congressman John Fogarty of Rhode Island was awarded the Alpha Omega Achievement Medal at the annual meeting of the dental fraternity in Washington, D. C., December 27-31. The medal is awarded annually for an outstanding contribution to dentistry or its allied arts, and has previously been accepted by Albert Einstein, Selman Waksman and Jonas Salk. In accepting the award, Congressman Forgarty, known as the "Champion of Better Health," indicated the Public Health Service plans to set up a special branch to "sell" proper health measures to the public.

Congressman John Fogarty of Rhode Island (left) receives the Alpha Omega Achievement Medal for 1960 from Michael Frost of Passaic, N. J., president of the dental fraternity.

The fifty-third session of the fraternity, which represents about 14 thousand dentists in the United States and Canada, was attended by over a thousand. Discussions were held concerning final plans for raising one and one-half million dollars for the building of the new dental school in Israel which was founded by the fraternity.

In other actions, Roberto Ruff of Mexico City received honorary membership and Max Rabinowitz of San Francisco was given the Meritorious Award of the fraternity.

At the concluding session on December 31, Fred Stein, Detroit, was elected president of the fraternity. Other new officers are: president-elect, Walter Levine, Baltimore; secretary, John Samuels, Cleve-

land; treasurer, Gilbert Robin, Pittsburgh, and editor, Marvin C. Goldstein, Atlanta, Ga.

Montreal, Canada, was chosen as the convention city for the 1961 session.

CASUALTY COURSES OPEN TO CIVILIAN DENTISTS

At the request of the Council on Federal Dental Services of the Association, Rear Admiral C. W. Schantz, chief of the Navy Dental Corps, has agreed to reserve two spaces for civilian dentists at each of the Casualty Treatment Training Courses presented for Navy dental officers.

Two courses have been scheduled for presentation at the U. S. Naval Training Center in San Diego, Calif.; the dates are Feb. 27-March 3, and March 27-31. Members interested in attending one of these courses should contact Mr. Herbert C. Lassiter, secretary, Council on Federal Dental Services, at the Central Office.

A. R. Frechette

A. R. FRECHETTE TO DIRECT U.S. NAVAL DENTAL SCHOOL

Capt. Arthur R. Frechette, Navy Dental Corps, on January 16 became the sixteenth Commanding Officer of the U.S. Naval Dental School, Bethesda, Md. He relieved Rear Adm. Eric G. F. Pollard, who will become director of dental activities, Fifth Naval District, Norfolk, Va., with additional duty as Commanding Officer, U.S. Naval Dental Clinic, Nor-

Delegates of the first dental seminar sponsored by the Clark Air Force Base hospital, the Philippines, are shown with their host, Lt. Col. William H. Book, left, chief of dental services. Scientific papers were presented and conferees discussed the latest dental methods during the one-day seminar which was attended by about 150 American and Filipino, civilian and military dentists. Above (l. to r.) are Colonel Book, B. B. Eraña, president, Asian-Pacific Dental Federation; Capt. Frank Etter, chief, dental services, Sangley Point; Col. Clifford Hawkins, chief, dental services, Armed Forces of the Philippines; Genaro B. Felizardo, dean of dentistry, University of the East, and Gavino Panem, out-going president, Philippine Dental Association.

folk. Dr. Frechette graduated from the University of Southern California College of Dentistry in 1928 and joined the Navy Dental Corps in 1936.

ABEL NAMED TO MEDICAL CARE ADVISORY COMMITTEE

John R. Abel, Los Angeles, president-elect of the American Dental Association, has been appointed the Association's representative on the Department of Defense Dependents' Medical Care Advisory Committee. The announcement was made by Frank B. Berry, Assistant Secretary of Defense. The purpose of the committee is to provide the Department of Defense with advice and assistance on matters relating to the medical care of dependents of the uniformed services in civilian medical facilities.

On Sunday, February 26—"Heart Day"—1,500,000 volunteers throughout the United States will call on neighbors in an effort to raise $27,500,000 to support research, education and community service in the field of cardiovascular diseases. The campaign is sponsored annually by the American Heart Association.

General

FLYING DENTISTS FORM FAR WESTERN COMPONENT

The Far Western Component of the Flying Dentists Association was formed recently, including dentists of the western states of Arizona, Nevada, California, Oregon, Washington, Alaska and Hawaii.

In addition to stimulating a fraternal relation among flying dentists and dental groups, the association holds among its purposes the securing of better life, health and accident insurance rates, as well as the stimulation of studies relating to dental and flying problems.

All dentists who are members of the American Dental Association and who hold, or have held, a pilot license of any type are invited to become members. Further information and application blanks for membership may be obtained from the secretary of the group, M. L. Miano, 1024 9th St., Los Banos, Calif.

HOGGARD TO HEAD MICHIGAN DENTAL SERVICE CORPORATION

The Michigan Dental Service Corporation has named Mr. Ferris M. Hoggard, Trenton, N. J., as its first full-time executive director. The corporation was organized in 1957 to provide prepaid dental care insurance to organized groups.

F. D. Ostrander, corporation president, said Mr. Hoggard's duties would include the development and administration of a prepaid dental care insurance program. For the past 12 years, Mr. Hoggard has served as an administrative officer for the U. S. Public Health Service. A 1947 graduate of Wake Forrest College, he will be located temporarily at 430 Stoddard Bldg., Lansing 23, Mich., in the office of the Michigan State Dental Association.

AMERICAN DENTURE SOCIETY RETAINS ITS NAME

The American Denture Society has not changed its name to the American Society of Prosthodontists, as was erroneously reported at the 1960 annual session of the American Dental Association in Los Angeles.

ORAL HYGIENE ARTICLE FOR TEENAGERS REPRINTED

An article entitled "How to Educate High School Students in Oral Hygiene" has been published in the *Journal of Health, Physical Education and Recreation,* a journal that reaches 22,000 high school teachers of health education. The article was written by Sumter S. Arnim, professor of pathology at the University of Texas Dental Branch, and Mr. Perry Sandell, director of the Bureau of Dental Health Education of the American Dental Association. Reprints may be ordered from the editor of the journal at 1201 Sixteenth St., Washington 6, D. C.

PSYCHOSOMATIC DENTISTRY GROUP TO MEET MARCH 10-12

The annual meeting of the American Society of Psychosomatic Dentistry and Medicine will be held March 10-12 at the Shoreham Hotel, Washington, D. C., immediately preceding the District of Columbia Dental Society meeting.

"Anxiety—Its Recognition and Handling in the Clinical Setting of General Practice" will be the main theme of the meeting. Round-table discussions will be held in the utilization of hypnosis in the various specialties of general practice.

The American Dental Assistants Association staffed an exhibit at the Mid-Continent Dental Congress held in November in St. Louis. Mrs. Betty Satterfield, executive secretary of the Missouri State Dental Association, took this picture which shows (seated, l. to r.) E. C. Brooks, Mrs. Gertrude Maxwell, Mrs. Lorna Adler and Robert C. Byrne; (standing) Miss Carolyn Weatherwax and E. J. Hempstead, all of St. Louis.

All dentists and physicians are invited to attend. Further information can be obtained from Dr. Jesse Caden, chairman of the program committee, 5213 Connecticut Ave., N.W., Washington 15, D.C.

DENTAL ASSISTANTS SPONSOR NATIONAL MEMBERSHIP DRIVE

The American Dental Assistants Association, with local societies in all 50 states, has launched a national drive to recruit members from among the 75,000 young women now working in dental offices throughout the United States. The contest will end June 30. First prize—awarded to the association member enrolling the most new members—is a round-trip ticket by plane or train to the 1961 A.D.A.A. convention in Philadelphia, and $150 to cover expenses. Second and third place winners will receive $100 and $50.

Sponsored by the Dental Division of Johnson & Johnson, the contest is aimed at promoting the education and position of the dental assistant. The association also is conducting a certification program, recently approved by the American Dental Association.

The American Dental Assistants Association has its national headquarters at 410 First National Bank Bldg., La Porte, Ind. Elma Troutman is executive secretary.

TWELFTH MID-ATLANTIC STATES CONFERENCE ON DENTISTRY

The Twelfth Mid-Atlantic States Conference on Dentistry will be held April 16-21 at Buck Falls, Pa. Its subject will be current clinical practices.

Essayists will include H. J. Bartelstone, D. Walter Cohen, Orville B. Coomer, S. Howard Payne, Samuel Seltzer and Robert B. Shira.

SCIENCE FAIR-INTERNATIONAL SUPPLIES MEDALS FOR AWARDS

The National Science Fair-International announces that medals for use as awards by state and regional science fair committees are available at nominal cost. These inexpensive medals are appropriate for distribution to students who produce outstanding exhibits at regional, state or nationwide science fair, or as awards for each classification in such a fair.

Science fair committees are invited to write for a sample medal provided their organizations are affiliated with the National Science Fair-International, Science Service, 1719 N Street, N.W., Washington 6, D. C.

TUFTS ALUMNI SCHEDULE ANNUAL MEETING

The Dental Alumni Association of Tufts University will hold its annual meeting March 15 and 16 with registered clinics at the school and the annual banquet at the Bradford Hotel, Boston. L. Walter Brown will be honored at the banquet and the speaker will be Leonard C. Mead. In addition to the annual business meeting, a luncheon will be held to honor the 50-year class. Further information can be obtained by writing to the secretary of the association at the school, 136 Harrison Ave., Boston 11.

A CORRECTION

In the December 1960 issue of THE JOURNAL the last paragraph of the article "Endodontic treatment of pulpless teeth" by Louis I. Grossman should have read: "A new, effective nonirritating medicament, consisting of a bactericide and a fungicide, used for sterilizing root canals, has been presented with some reservation until such time as additional data are available."

international dentistry

News from Great Britain

An editorial in the *British Dental Journal* of October 18 on confectionery and caries contains the following:

"The president-elect of the British Federation of Wholesale Confectioners has taken exception to statements made by the British Dental Association concerning the harm which arises from the unrestricted eating of sweets. He was reported in the Press as saying that the fault lay with the dental profession and school managements, and that there were two major reasons for dental decay: lack of instruction in dental hygiene both at school and in the home, and insufficient dental care in schools.

"The British Dental Association does not organise or control the school dental service, but its members have been urging for well over half a century that those responsible for the education and health of children should provide the facilities and services necessary for adequate instruction and treatment.

"The only fault . . . that can be laid at the door of the dental profession is the fact that its funds available for telling the public the truth about dental disease are of necessity small, but this money is used in an attempt to reduce the amount of disease which the dental profession treats. On the other hand, the confectioners spend hundreds of thousands of pounds each year in advertising their wares to the public, their sole object being to inflate their own profits, and the commodities they sell undoubtedly cause dental disease with its untold misery to millions of children. If a small fraction of the sum spent on persuading children to buy sweets and biscuits for the benefit of confectionery manufacturers were used for research into the means by which these products cause disease, those who provided it would be benefiting the whole of mankind.

"The eating of sweets and sugary confections is pleasurable but, like most pleasures, should be subject to discrimination and control. Few children could be expected to exercise such control and a vast number of parents are unaware of its necessity.

"Although healthy children and adults do not need sweets or any considerable amount of concentrated sugar to provide energy for normal activities, if taken in moderation at the right times and with suitable precautions they are not likely to cause much harm.

"Sweets, biscuits, and other such confections capable of producing dental decay should therefore be eaten only when some form of cleansing can be used immediately afterwards and if this cannot be done during school hours they should be prohibited during that period."

The School Dental Service • W. Ritchie Young, Chief Dental Officer to the London County Council, in an interview whose aim was to obtain a picture of the way a local council authority works and the problems it faces with regard to children's dentistry, is reported to have expressed the following views:

"The finance of the School Dental Service is dependent upon monies from the Local authority who obtain their resources from a

Government Block Grant and the local rates."

Mr. Young maintained that "money influenced by politics" was a basic controlling factor in these services. The Dental Section, at the head of which, in an advisory capacity, is the Chief Dental Officer, is responsible to the Medical Officer of Health, dentistry "being the tin-can on the tail of the medical profession." The Medical Officer of Health is responsible to the County Council Health Committee, whose activities may be affected by the Finance Committee of their Council and by the Government Authorities, or both. Upon the committees involved sit many lay people who have no practical knowledge of the potential or requirements of the School Dental Service, and professional negotiation with bodies of such complexity can be very difficult.

Scope of treatment from the purely professional point of view is greatly restricted for many patients. Dental inspections at schools may assess the need for treatment, but owing to the restricted numbers of Dental Officers in many places, service available can meet only the demand (or response) and not the full need. Each clinic is delegated so many schools. It is hoped that the Dental Officer will be able to visit these schools at regular intervals. Unfortunately, owing to staff deficiencies, a clinic may have as many as 30 schools attached to it, an impossible catchment area from the dental care point of view. In circumstances of this nature there can be little, if any, systematic revisional treatment, without which much of the dental treatment given could be of little lasting value.

When members attending school clinics are maintained, no inspections in schools are carried out, and such inspections are provided only when "demand" or acceptance of treatment is below the working capacity of the clinic. This working capacity, or tempo, of the clinic is set at the rather high figure of three treatments on patients per hour; that is, nine per session.

Remuneration of Dental Officers is determined by one salary scale fixed by "Whitley negotiation," at present eight annual increments to a maximum of £1,735 per annum. The salaries are not related to earnings of dentists working elsewhere, but to those of other local authority officers. The salary is determined in consultation with the B.D.A.

An ancillary service along the lines of that now in use in New Zealand could well be employed in London. Mr. Young did not feel happy, however, about present government plans to produce such a service, nor about its relationship with the School Dental Service, or with the rest of the dental profession. Teachers at present view the project with some doubt.

Teaching in the dental schools so far as children's dentistry was concerned, is grossly inadequate. In not encouraging this most important aspect of Dentistry, there is a lack of stimulus for students to enter a Children's Dental Service.

Mr. Young maintained that dental propaganda of the past years has been too complicated and detailed. He felt that a simple slogan such as "Have a clean mouth" was adequate for the lay public, and he added, should be sponsored on a wide scale by the Government—not by parties with vested interests. He did not feel that high-powered propaganda should at present be used, as the School Dental Service would be unable to cope with any greatly increased demand on their insufficient staff.

Department of Dental Science, R.C.S., England • At the end of September Sir Wilfred Fish retired as honorary director of the department of dental science at the Royal College of Surgeons of England. The department was established by the Faculty of Dental Surgery at the College less than five years ago. Sir Wilfred assumed direction in 1956, and at the end of that year the department occupied one office and a borrowed laboratory. Within a short period it had expanded into three laboratories improvised out of rooms in the basement of the old college building. By April 1959 the new laboratory block erected on the south side of the college had been completed and the department moved into the excellent accommodation now occupied by a staff of six scientific workers and five auxiliaries. The dental profession owes a considerable debt to Sir Wilfred for the zeal and enthusiasm he brought to bear in launching this enterprise and in establishing a functioning research department within a relatively short period. He is succeeded as director by Professor B. Cohen who, earlier this year, was appointed to the Nuffield Chair of Dental Research in the Royal College of Surgeons.

Ministry of Health: New Chief Medical Officer • The Chief Medical Officer of the Ministry of Health, the Ministry of Education and the Home Office, Sir John Charles, K.C.B., M.D., F.R.C.P., D.P.P., Hon D. Hy., retired from public service on November 30, 1960. He has been Chief Medical Officer since May 1950. The Minister of Health, the Minister of Education and the Secretary of State for the Home Department have appointed George Edward Godber, Esq., C.B., D.M., F.R.C.P., D.P.M., a Deputy Chief

Medical Officer in the Ministry of Health, to the joint post from December 1, 1960.

Students of Dentistry • *The Returns from Universities and University Colleges in receipt of Treasury Grant: Academic Year 1958-59,* published by the University Grants Committee, contains much information of dental importance. It may be noted that the total number of dental students at all stages of the course in England, Wales and Scotland was under 3,000, and that 20 per cent of these were women. Just over one-third of the total number of students was being trained in London, where the proportion of women was again 1 in 5. This is about the same as the proportion of women medical students in London, but rather lower than the figure for women medical students in the whole of Great Britain. In Scotland the total number of dental students was 559 and the proportion of women students both in dentistry and medicine about 1 to 4.

A comparison between student numbers and the numbers of fulltime teaching and research staff in dentistry and medicine in Great Britain shows that the ratio for medicine is 1 member of the staff to 6 students, but in dentistry only 1 to 13. The total of this fulltime staff is given as 217 among whom were 27 professors, 17 readers and 45 senior lecturers.

G. H. Leatherman, D.M.D., F.D.S., R.C.S., F.A.C.D.

News from Brazil

New Officers of the São Paulo State Dental Association • On December 3, 1960, the São Paulo State Dental Association elected new officers for 1961-62. They are: president, Antônio Saraiva Filho; vice-president, Marcelo Augusto Galante; secretary general, Hélio de Freitas e Silva; assistant secretary, José Antônio Villas Bôas; treasurer general, Francisco de Assís Magalhães; assistant treasurer, Bernardo Cupertino; Commission of Class Defense, Sylvio Bettarello, Jair Costa Pastore, José Victor dos Santos, and Oswaldo Farina; fiscal council, Paulo Bueno Brandão, Dácio de Oliveira Martins and Márcio Vieira Conde.

Among the projects proposed by the new regime is a reform of the bylaws of the organization, marking its fiftieth year, to enable it to associate this celebration with several events, mainly the second São Paulo Dental Convention. It also will continue efforts toward the construction of a new building, attempt to have the National Council of Dentistry approved by federal law as soon as possible, and assess the best means to introduce retirement pensions for dentists.

Distinguished Visitor • Prof. Benjamin Gomez Herrera, ex-president of the Pan American Council of Dentistry for Children, and professor at the University of Bogota, Colombia, visited Brazil early in November 1960, during a trip to all Latin America to organize an International Convention of Dentistry for Children, sponsored by the United Nations. During his stay in Brazil, Dr. Herrera contacted many pedodontists and lectured at several clinics and association meetings.

School of Dentistry at Pernambuco • The School of Dentistry of Pernambuco, founded in March 1955, and authorized in December 1957, was recently recognized by the president of the Republic of Brazil by a federal decree.

Since its foundation, this school's dean has been Prof. Edrizio Barbosa Pinto, who also presides over the Society of Dentists of Pernambuco and the Pernambuco Society of Dentistry for Children.

There are 19 departments at the school: histology, anatomy, dental materials, dental technics, microbiology, prosthodontics I, physiology, pathology, radiology, pedodontics, pharmacology and therapeutics, clinic I, prosthodontics II, orthodontics, hygiene, buccofacial prosthesis, legal dentistry, surgery and clinic II.

Hans Freudenthal, C.D.

News from Australia

Retirement of Kenneth Adamson • On the eve of his retirement from the office of president of the Australian Dental Association, after serving six years, Kenneth Adamson was honored by members of the Council at a dinner October 22, 1960, at the Naval and Military Club, Melbourne. A. Gordon Rowell, vice-president, presented Dr. Adamson an original oil painting by Mr. John Rowell, F.R.S.A., and a vase of Royal Copenhagen porcelain for Mrs. Adamson.

Election of Officers • At the annual meeting of the Federal Council October 22-23, 1960, at Melbourne, the following officers were elected for the ensuing two years:

President, A. Gordon Rowell, Sydney; vice-presidents, J. M. Wark, Melbourne, and Mr. R. J. Dingle, Brisbane; honorary secretary, Mr. R. Y. Norton, Sydney; honorary treasurer, W. A. Grainger, Sydney.

Permanent Federal Secretariat • Subsequent to the annual meeting of the Federal Council, the office of the Association was transferred to Sydney where a permanent Federal Secretariat is to be established. This was the culmination of plans to develop and organize an appropriate central organization incorporating all the activities of the association, and to provide for future expansion. The new address is the T. & G. Building, 49 Park Street, Sydney.

National Dental Health • In December 1959, after lengthy negotiations, the Minister for Health informed the Australian Dental Association that he had come to the conclusion that a government-assisted voluntary dental insurance scheme was not a practical proposition.

Subsequently, officers of the Blue Cross Association suggested that the dental profession should accept some responsibility for a dental scheme by forming a nonprofit Dental Benefits Company, with the possibility of the Blue Cross Societies then acting as administrative agents. This proposal was submitted to state branches of the Australian Dental Association and rejected unanimously, because it was believed that the profession could not underwrite such a scheme.

Bureau of Public Dental Health • Representations have been made to the Minister for Health, by the association, for the establishment of a Bureau of Public Dental Health within the Department of Health, Canberra. After consultation with Donald J. Galagan of the United States Public Health Service, a memorandum was drawn up of the association's proposals for the establishment of such a bureau and submitted to both the Minister and the Director-General of Health. The matter has received favorable consideration and is under review by the Commonwealth Department of Health.

Auxiliary Personnel • A most significant development in the matter of auxiliary personnel has occurred in the Territory of Papua and New Guinea, where the Commonwealth Government, through its Department of Territories, has established a full dental service staffed almost exclusively by natives who have taken a three-year course organized by the Department of Public Health in Suva. This service is organized from Canberra, and the secondary education standard of those admitted to the course is in no way comparable to the examination for entrance to Australian universities.

Amendments to Dental Legislation • During the year there has beeen a renewal of activity calling for amendment to the existing Dental Acts by groups of dental technicians in Tasmania and New South Wales. A memorandum forwarded to all members of Parliament in Tasmania by the Dental Mechanics and Dental Employees Association gave its version of the functioning of the Act, and requested a liberalization of the certification clause in rural areas remote from the practice of a dentist. The Tasmanian branch of the Australian Dental Association has not opposed this suggested amendment.

In New South Wales the Premier announced the intention of his government to introduce legislation to allow dental mechanics to deal directly with the public.

Since the June 1960 conference of the Labor Party, when this undertaking was restated, the intent of the legislation has been approved by Cabinet and caucus. The terms

of such legislation are now being prepared by the Health Department, and the bill at present is in the hands of the parliamentary draughtsman.

In both Tasmania and New South Wales active campaigns, including the use of the press, radio and television, have been conducted by the state branches of the Australian Dental Association against such legislation, with the fullest support and cooperation of the federal office.

Australian Dental Congress • The sixteenth Australian Dental Congress is to be held in Sydney August 14-18, under the patronage of the Governor-General of Australia, Viscount Dunrossil.

The venue for the congress will be the University of Sydney and the Sydney Dental Hospital, and the scientific program will be conducted daily for the duration of the event. Leading overseas guest lecturers who have accepted invitations include O. B. Coomer, Louisville, Ky., Nathan Friedman of Beverly Hills, Calif., and Professor G. N. Davies, Otago, New Zealand.

Defense Forces • A significant development during the past year has been the appointment of four consultants to the Royal Australian Army Dental Corps, thereby bringing the Dental Service into line with its medical counterpart. The fields covered by these officers are operative dentistry, prosthetic dentistry, oral surgery and orthodontics; each officer holds the rank of Lieutenant-Colonel.

Another matter of interest in this sphere has been the establishment of an undergraduate scheme for the recruitment of dental officers, under which students who have embarked on the third, fourth or fifth year of the dental course may obtain financial assistance from the Defense Department on giving assurance that they will serve in the forces for an appropriate period after graduation.

University Training • The University of Sydney is to increase the length of the course of training for the graduating degree in dentistry. The change became effective January 1, 1961, and requires a minimum time of five calendar years of study before graduation. It is expected that the University of Queensland shortly will implement a similar change and when this is done the five-year requirement will be uniform throughout Australia.

A diploma course in public health dentistry is to be available at the University of Sydney for graduates in dentistry. The course will require a minimum of one calendar year, and applications will be received from Australian and foreign graduates in dentistry. This course will begin in the academic year for 1961.

Institute of Dental Research • The Institute of Dental Research, United Dental Hospital of Sydney, in the fourteenth year since its establishment, has suffered an unfortunate loss in the deaths of the director, Neil Goldsworthy, and his assistant director, Harold Sullivan. Dr. Goldsworthy established the institute and, with Dr. Sullivan, placed it in the forefront of research in dental problems in Australia. Both men had made journeys overseas, and were well known in the United States and the United Kingdom for their writings. *Robert Harris, M.D.S.*

International News in General

STEFAN LOOS PRESIDENT OF AUSTRIAN DENTAL GROUP

Stefan Loos, Professor of the Dental Institute of the University of Vienna, was elected president of the Austrian Dental Association (*Verein Österreichischer Zahnärzte*) at the association's annual session which took place on November 10, 1960, in Vienna. Professor Loos will serve as successor of the late Prof. F. Driak. At the same meeting, three prominent Austrian dental educators, Prof. Ullik (Vienna), Prof. Trauner (Graz) and Prof. Preissecker (Innsbruck) were named honorary members of the Austrian Dental Association.

URUGUAY, ARGENTINA PLAN INTERNATIONAL CONGRESS

The International Dental Congress of Uruguay-Argentina will be held November 12-19, 1961, in Montevideo, Uruguay. The joint meeting has been arranged through agreement of the Asociación Odontológica Argentina, Círculo Odontológico de Rosario, Círculo Odontológico de Córdoba, Círculo Odontológico del Oeste, División Odontológia de Gendarmería Nacional, and the Asociación Odontológica Uruguaya. The organizations sponsored a similar meeting in 1959 in Buenos Aires.

Directors and commissions for the 1961 congress have been selected. Julio C. Turell is president of the executive committee. Francisco W. Pucci and Mario Garcia Gentini are secretaries of the executive committee.

the reader comments

'FIBERGLAS' IN CAVITY PROTECTION

Charles B. Caldwell and Maury Massler have recently discussed "Cavity Protection" through letters to THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION, December 1960.

It is most interesting to note that in the October 1956 issue of *The New York Journal of Dentistry*, page 301, John Oppie McCall brought out the need of a material other than dental cement for cavity protection, and protection of the vital dental pulp. The protection against leakage and irritation as well as from pressure was emphasized.

Upon writing to Dr. McCall on this topic, I placed before him my clinical findings which were published in the years of 1945, 1947, and later, on the use of Fiberglas as a reinforcing agent in operative dentistry, emphasizing the feature of dimensional stability of the reinforced material. Dr. McCall asked me to bring this information to the attention of the editor of the *New York Journal of Dentistry*, which I did. Soon thereafter in this journal there appeared an item relating to this method of cavity protection.

All reference to Fiberglas in dentistry has been based on my clinical findings, and certain salient data supported by materials of medical source. Besides publication of these technics I have had the opportunity of presenting a clinical lecture on this topic before the annual session of the Dental Materials Group of the International Association for Dental Research, in the year of 1949.

Since 1956 William Ward Wainwright has had under consideration and planning the testing of the materials which I recommended in cavity protection.

The matter of cavity protection is a significant proposition which deserves continuing clinical and formal investigation. Good judgment in this area is in demand.

Harry Maeth, D.D.S.
P.O. Box 226, Mosinee, Wisconsin

FISH AND WILDLIFE SERVICE

As a dentist and biologist, engaged in research, I have followed with increasing admiration the capable efforts of our American Dental Association in marshalling increased support for dental research. Accordingly, in a spirit of constructive criticism, a dissenting opinion is here offered on a portion of the editorial entitled, "Funds for Research in the Fields of Health," which appeared in the October 1960 issue of THE JOURNAL. I stress a hearty accord with the purpose and intent of the editorial. The one item in dispute, however, is serious enough to warrant this letter.

It is apparently the feeling of the writer of the editorial, based upon figures released by the National Health Education Committee, Inc., that dental research has been neglected while the Fish and Wildlife Service of our government has received a large budget to protect wild life "from the hazards of rod and gun." My reaction to this aspect of the editorial is that there may exist a misconception concerning the activities of the Fish and Wildlife Service. First, let me say that many people serving in the Fish and Wildlife Service are our scientific kinfolk. They are biologists. Their efforts in service to "rod and gun" are secondary to, and derive solely from, their major interest and work, which is to attempt the almost impossible task of managing small segments of the marine and terrestrial environments so as to achieve an ecological balance of organisms in nature. This happens to be in the interest of biological science, in the interest of the nation's and the world's food supply, and also very much in the interest of public health. For sudden or disastrous (and even nondisastrous) changes in our animal populations may be fraught with serious consequences for the human. Among the research scientists of the Fish and Wildlife Service are outstanding contributors to fundamental research in biology. In addition to their vitally

important ecologic researches, they have contributed notably in the fields of cell development, experimental embryology and calcification. This has been done more often than not, in spite of woefully inadequate support.

If our pie is smaller than that of the Fish and Wildlife Service, the answer does not lie in casting envious eyes on a neighboring discipline. The answer lies in what the American Dental Association has indeed been attempting to do, namely, get more dough and bake a bigger pie!

In recent years, there has been much competition between professions and within professions, for a greater share of public and private funds. Some of the performances have been shameful and inexcusable. Let us not, in dentistry, fall into these ways. I do not wish to imply that the writer of the editorial is so doing, but the inclusion of Fish and Wildlife Service appropriations in the same category with weapons expenditures and highway development is to me, unfair.

Within the last decade there has been a resurgence of interest in the establishment of a broader scientific basis for dental practice. The area of knowledge involved has been designated by some as "oral biology." It is not generally appreciated (and somewhat ironic in the present circumstance) that there exists a core of pure biology which serves as a nucleus for the dental science we seek, and which takes its origin in the biology of fishes. As one familiar with the researches and performances of the biologists in the Fish and Wildlife Service, I feel that dentistry, as a profession, has much to gain from support and appreciation of the efforts of these people. As citizens, we are all in their debt.

Philip Person, D.D.S.
144-54 69th Avenue
Flushing 67, New York

USE FOR OLD AIR COMPRESSORS

There are many children suffering from cystic fibrosis who can be helped by a piece of dental equipment rapidly becoming obsolete. With the advent of higher speeds for operative work by air turbine handpieces, where compressed air is the power source, larger and more efficient compressors are needed. Many older compressors have been taken in trade or credited towards the purchase of new ones. Many more are set aside in dental offices or have been moved to the cellar workshop where their owners are "thinking of hooking the engine up to a wheel-rig for sharpening stones or something."

Most of the children afflicted with cystic fibrosis require the use of nebulizers (vaporizers) while they sleep. This is the means used to deliver medication so that the thick mucus which is secreted in their lungs while they are sleeping can be thinned out and thus coughed up. If this regime is not followed, mucous plugs may form which seriously cut down the area of lung surface available for oxygen-carbon dioxide exchange. Violent fits of coughing occur which may rupture alveoli and lead to further difficulties such as emphysema and atelectasis. The uninterrupted working of the nebulizers delivering the mucus-thinning medication may be lifesaving, for the ability to cough up the mucus is essential.

The present machines available for this purpose, while helpful, have serious deficiencies. They are small portable units for bedside use and have a tendency to require frequent repairs. The dental compressor is ideal, however. With a reducing-type gauge and rubber suction or copper tubing, it can be placed in the basement and the air under pressure run to the bedroom of the patient.

If any dentists wish to donate their old compressors to this cause, they would be most graciously accepted. However, since dental compressors represent an initial investment, some financial return is entirely justifiable. Any interested dentist may contact his state chapter of the National Cystic Fibrosis Research Foundation, giving his name, address and the expected price.

By putting old dental air compressors to work once again, we can extend to another field our endeavors to make patients more comfortable.

Robert E. Lee, D.D.S.
167 Union Avenue
Framingham, Massachusetts

LIKES BOOK REVIEW

Enclosed is a check for $8.50. Please mail to me the second edition of "The Dental Assistant." I was introduced to the book through the December 1960 issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. I liked the way the review read [Ed. note: reviewer was Helen M. Constable], and feel that it will be the help that I need so as to improve myself. Thank you.

V. J., Vallejo, California

A. Y. Clarke
Oregon

E. H. Van Santvoord
Vermont

J. Y. Parsons
West Virginia

1961

F. A. Helig
Canal Zone

State Dental Association Presidents

R. W. McEldowney
Pennsylvania

R. A. Smithson
Alaska

E. H. Lee
Idaho

Alan Y. Clarke, a general practitioner in Portland, is president of the Oregon State Dental Association. Dr. Clarke received a B.S. degree in 1939 from the University of Idaho, and a D.M.D. degree in 1943 from the North Pacific College of Dentistry. He has served as secretary and president of the Portland District Dental Society. He is a member of the American Academy of Gold Foil Operators, the Oregon Association for Dental Research, and Delta Sigma Delta. Active in civic affairs, Dr. Clarke is a member of the Portland Chamber of Commerce, the Citizens School Committee, the Oregon Museum of Science and Industry, and Toastmasters International. He is married and the father of three—Calvin, 10, Mark, 7, and Jane, 5. His hobbies are golf and fishing.

Edgar H. Van Santvoord, president of the Vermont State Dental Society, is a general practitioner in Rutland. He received his B.S. from Hamilton College in 1934 and his D.M.D. from Tufts University School of Dental Medicine in 1943. Dr. Van Santvoord holds membership in the New England Dental Society, Tufts Dental Alumni Association, Rutland Chamber of Commerce, and Center Lodge No. 34 of the Masonic Order. Dr. Van Santvoord is married and the father of three—Philip G., 17, Gwen, 15, and John C., 13. During World War II he served in the Navy Dental Corps from 1943 to 1945.

John Y. Parsons, president of the West Virginia State Dental Society, is a general practitioner in Huntington. Dr. Parsons received an A.B. degree from Oberlin College in 1929 and a D.M.D. degree from the Harvard School of Dental Medicine in 1933. He has served as secretary-treasurer and as president of the Huntington Dental Society. Dr. Parsons is a member of the Pierre Fauchard Academy and of the Lions Club and Elks Club. He is a member of the dental staff of the Cabell-Huntington Hospital. Dr. Parsons is a deacon in the First Congregational Church of Huntington. He is married and the father of three children—John I., 26, David G., 25, and Patricia I., 20. Dr. Parsons' hobbies are camping, landscaping, woodworking and model railroads.

Frederick A. Helig, a general practitioner currently serving with the U.S. Army Technical Services at Ft. Clayton, Canal Zone, is president of the Panama Canal Zone Dental Society. Dr. Helig received his D.D.S. degree from the Georgetown University School of Dentistry in 1946. In 1958-1959 he studied oral medicine at the University of Pennsylvania. In 1952 he did postgraduate study at Walter Reed Army Hospital, Washington, D.C. Dr. Helig is a member of the American Academy of Dental Medicine. Married, he is the father of two children, Sandra Faye, 9, and Alan B., 7.

Robert W. McEldowney, president of the Pennsylvania Dental Association, is a general practitioner in Harrisburg. After attending George Washington University, Dr. McEldowney received his D.D.S. degree from the University of Pittsburgh School of Dentistry in 1926. He has served on many committees of the Pennsylvania Dental Association and has served in the House of Delegates of the American Dental Association. Dr. McEldowney is a member of the Blue Lodge, Consistory Shrine, Masonic Order. He is a past president of the Rotary Club of Colonial Park and of the Colonial Park Community Club, and is a member of the Harrisburg Chamber of Commerce. He is a Fellow of the American College of Dentists. Dr. McEldowney is married and the father of two children, Robert W. McEldowney III, 24, and Carol E., 21. Dr. McEldowney's hobbies are golf and photography.

Robert Anton Smithson is president of the Alaska Dental Society. A general practitioner in Anchorage, Dr. Smithson received his undergraduate training at Cleveland College and Adelbert College, and his D.D.S. in 1945 from the School of Dentistry, Western Reserve University, Cleveland. He is a member of the Pierre Fauchard Academy. In 1958 he served as president of the Anchorage Dental Society. He has served as president of the Skagway Chamber of Commerce, president of both the Anchorage Chamber of Commerce and Anchorage Dinner Club, chairman of the board of the Anchorage Y.M.C.A., chairman of the City of Anchorage Planning Commission, member of the Greater Anchorage Board of Health, and president of the Inlet View P.T.A., Anchorage. Dr. Smithson in 1958 was a lay delegate to the general convention of the Protestant Episcopal Church. He is a Mason and a member of the Skagway Lodge 431, B.P.O.E. Dr. Smithson is married and the father of four children—Christine Lee, 13; Judith Marie, 11; Robin Anton, 7, and Peter James Anton, 3.

Edwin H. Lee, president of the Idaho State Dental Association, is a general practitioner in Rigby. After graduating from Ricks College in 1925, he studied at the University of California College of Dentistry and received his D.D.S. in 1932. Dr. Lee has served as president of the Upper Snake River Dental Association and as trustee of his state association. He is a member of the Lion's Club and the Knife and Fork Club. He is married and the father of one daughter, Carolyn Lee Hansen, 21. He is active in church work. His chief hobby is fishing.

book reviews

DO THEY UNDERSTAND YOU?

By Wesley Wiksell. 200 pages with illustrations. Index. $4.95. New York, Macmillan Co., 1960.

Although the author makes the point that most of his material is directed toward the employer-employee relationship, we, as dentists, have undoubtedly asked ourselves, "Do our patients understand us?" When we discuss treatment plans, do they understand us? When we discuss fees, do they understand? And when we answer their questions, do they understand?

Mr. Wiksell refers to a definition by Webster of the word "communication" which says it is "the interchange of thoughts or opinions." Since it has been well established that "patient education" is one of the most important tasks we dentists have, it would seem prudent for us to take every means of improving our communications systems.

This book, written by a professor of speech at Louisiana State University, is primarily concerned with technics of face-to-face communication. Even though it is not aimed primarily at doctor-patient relationships, the suggested technics are basic and can be adapted to virtually any vis-a-vis relationship.

A subtitle calls the book a *Guide to Effective Communication*. Mr. Wiksell believes that sounds, gestures, posture, silence and facial expressions convey our feelings. The dentist, who is constantly attempting to communicate—and who more than not has difficulty in so doing—would do well to read this book.

The author has prepared an easily read, understandable text complemented by numerous illustrations. The publishers have seen to it that make-up, typography and binding are all in good taste.

Theodore C. Levitas

THE ESSENTIALS OF ROENTGEN INTERPRETATION

By Lester W. Paul and John H. Juhl. 839 pages with 1,203 illustrations. Index. $25. New York, Paul B. Hoeber, Inc. Medical Book Department of Harper & Brothers, 1960.

This well-written volume is a systematic review of the various technics, (both common and complicated) used in the roentgenographic examinations of the various anatomical structures and pathological lesions of the body.

Introduced by an informative section on bone formation and skeletal development, including anomalies and dysplasias of the skeleton, each subsequent section deals with numerous pathological conditions found in individual anatomic regions.

The text is divided into six sections and an appendix; it is concise and well organized. Of considerable interest are the numerous and excellently reproduced clinical photographs, depicting lesions of the various anatomic structures, with sufficient clinical and pathological correlation to clarify the roentgenographic descriptions.

This book is written basically for the general roentgenologist; however, it also is of value to the oral roentgenologist and the oral surgeon, since section six, "The Face, Mouth and Jaws," contains much basic diagnostic information.

The appendix, which should be a prefix, is a short but factual description of, "Radiation Hazards in Diagnostic Roentgenology," which should be first in the minds of all concerned.

The type is large and easily read; the many references appended to each section indicate the source material in the literature and represent a valuable feature.

LeRoy M. Ennis

current literature

ALLEVIATION OF PAIN DURING ROOT CANAL TREATMENT

Fritz Driak. Österr.Zschr.Stomat. 56:180 June 1959.

The alleviation of pain is one of the most important problems in dentistry, especially in cavity preparation and root canal treatment.

Inadequate anesthetization of the pulp during pulpectomy or pulpotomy causing fulgurant pain often results in leaving parts of the radicular pulp in the root canal and in an insufficient filling of the canal. It is clear that in such instances, the filling reaches only to the hypersensitive, traumatized parts of the pulp. Although pain is not always an indication of pulpal damage, premedication with an analgesic, antineuralgic, sedative or hypnotic is recommended before endodontic procedures are undertaken.

Local anesthesia (terminal, plexus or infiltration anesthesia) is applied routinely in instances of a hypersensitive cavity to produce painless excochleation at the Dental Clinic of the University of Vienna. The same procedure is used in the preparation of vital teeth for direct or indirect pulp capping and for surgical excision of the coronal portion of the pulp.

During root canal treatment, irradiation with ultraviolet, infrared or short-wave rays usually produces favorable—although only temporary—results in the alleviation of pain.

The analysis of pain associated with root canal treatment, however, must be based on careful histologic observation and not alone on clinical observation. Absence of pain may be caused by necrosis of the pulp resulting in inability of the pain-receptor cells to receive stimuli. Any surgical or endodontic procedure on or about the pulp may give rise to potential pain. The dentist, therefore, must anticipate and be able to treat adequately any more or less localized sensation of discomfort, distress or agony, resulting from root canal treatment.

HEREDITARY DENTINOGENESIS IMPERFECTA

By Orlen N. Johnson, A. P. Chaudhry, R. L. Gorlin, David F. Mitchell and W. L. Bartholdi. J.Pediat. 54:786 June 1959.

A review of the literature on hereditary dentinogenesis imperfecta, and genealogic, clinical, roentgenographic and histopathologic studies of this anomaly in members of three families and in a child with an unknown family history have led to the following conclusions:

1. The hereditary factor responsible for this anomaly probably is a non-sex-linked dominant factor.

2. There is no definite correlation between this anomaly and systemic disorders such as nutritional deficiencies, blood dyscrasias, infectious diseases or metabolic disturbances. Instances of osteogenesis imperfecta associated with opalescent dentin have been reported but the exact relationship in their mode of transmission is not well understood since each condition also may occur independently.

3. Both deciduous and permanent dentitions may be affected by dentinogenesis imperfecta.

4. The anomaly is limited primarily to dentin. Enamel may be thin but is normal in other respects. The early loss of enamel presumably is a result of the defective dentinoenamel junction.

5. The tendency of the defective secondary dentin to obliterate the pulp chamber and root canals is not entirely in response to attrition, since unerupted teeth also exhibit the reduced pulp cavity. The obliteration could be caused by abnormal activity of the odontoblasts.

6. No unusual tendency toward the development of periapical pathosis or resistance to dental caries was evident in the subjects in this series.

deaths

BUREAU OF MEMBERSHIP RECORDS

Allen, Andrew M., Cleveland; Western Reserve University School of Dentistry, 1918; died September 13; age 72.

Barber, Peter T., Omaha; Chicago College of Dental Surgery, 1895; died October 18; age 88.

Barnes, Willard N., Brooklyn; Baltimore College of Dental Surgery, University of Maryland, 1898; died September 30; age 83.

Baughman, Herrick A., Carlsbad, Calif.; Indiana Dental College, 1915; died September 16; age 67.

Beveridge, Charles D., Billings, Mont.; Chicago College of Dental Surgery, 1917; died August 29; age 65.

Braffman, Samuel, New Haven, Conn.; Tufts College Dental School, 1932; died August 17; age 53.

Brallier, John K., Ligonier, Pa.; Medico-Chirurgical College of Philadelphia, 1902; died September 17; age 84.

Brannen, Malcom H., Spur, Texas; State Dental College, 1917; died September 12; age 67.

Brashears, William N., Dallas, Texas; died February 24; age 72.

Braunwarth, Isadore H., Janesville, Wis.; Marquette University School of Dentistry, 1922; died September 28; age 61.

Brewer, William N., Niagara Falls, N. Y.; University of Michigan School of Dentistry, 1912; died September 22; age 71.

Brown, Jerome P., Springfield, Vt.; University of Pennsylvania School of Dentistry, 1953; died September 22; age 39.

Brown, Russell C., Fort Lauderdale, Fla.; University of Pennsylvania School of Dentistry, 1918; died August 15; age 64.

Brown, Washington I., Savannah, Mo.; Western Dental College, 1905; died August 22; age 79.

Burkhardt, William G., Champaign, Ill.; Chicago College of Dental Surgery, 1896; died September 16; age 85.

Burton, Edgar L., Topeka, Kan.; Kansas City Dental College, 1908; died October 2; age 83.

Call, Samuel F., Waco, Texas; Vanderbilt University School of Dentistry, 1913; died September 5; age 72.

Carle, Ernest E., Wakefield, Mass.; Harvard Dental School, 1899; died September 22; age 89.

Carpenter, Victor H., Boston; Harvard Dental School, 1913; died October 14; age 69.

Coffman, Clarence W., Columbus, Ohio; Ohio Medical University College of Dentistry, 1906; died September 20; age 77.

Connor, Tom V., Edinburg, Texas; Baylor University College of Dentistry, 1933; died July 27; age 49.

Coyle, Maurice J., St. Louis; St. Louis University School of Dentistry, 1928; died September 17; age 54.

D'Alecy, Anthony J., Stapleton, N. Y.; New York University College of Dentistry, 1934; died October 6; age 49.

Dodd, Whit R., Richmond, Va.; Medical College of Virginia Dental Department, 1913; died June 2; age 73.

Dodge, Clarence A., Beverly Hills, Calif.; University of Iowa College of Dentistry, 1897; died September 28; age 83.

Doty, Fred H., Lawrence, Kan.; Western Dental College, 1917; died September 17; age 63.

Edlund, Eskill W., Indialantic, Fla.; Northwestern University Dental School, 1912; died September 11; age 73.

Elkins, Tosh E., Dunbar, W. Va.; Baltimore College of Dental Surgery, University of Maryland, 1916; died September 7; age 72.

Ellsworth, Lewis N., Salt Lake City; Chicago College of Dental Surgery, 1907; died October 1; age 81.

Entwistle, Frank, Malverne, N. Y.; College of Dental and Oral Surgery, 1917; died September 14; age 73.

Epstein, Harry, Indianapolis; Indiana Dental College, 1918; died September 14; age 63.

Farwell, Harry R., Quincy, Ill.; Northwestern University Dental School, 1910; died July 31; age 77.

Finelli, Alphonse R., Mamaroneck, N. Y.; Tufts University School of Dental Medicine, 1932; died October 15; age 53.

FitzHugh, John C. G., McKeesport, Pa.; University of Pittsburgh School of Dentistry, 1906; died September 6; age 76.

Ganulin, Herman W., Beverly Hills, Calif.; University of Southern California School of Dentistry, 1928; died September 26; age 54.

Gearheart, Walter J., Olney, Texas; University of Denver School of Dentistry, 1926; died September; age 63.

Goble, Paul S., Island Heights, N. J.; Medico-Chirurgical College of Philadelphia, 1912; died September 27; age 70.

Goldfarb, Nathan A., New York; New York College of Dentistry, 1924; died September 24; age 59.

Goodridge, John G., Salem Depot, N. H.; Tufts College Dental School, 1917; died October 19; age 66.

Gross, W. G., Gary, S. D.; Louisville College of Dentistry, 1917; died September 16; age 68.

Habenicht, Alfred G., Fort Bragg, N. C.; University of Denver School of Dentistry, 1929; died September 12; age 53.

Haines, Harland E., Chicago; Chicago College of Dental Surgery, 1914; died September 28; age 69.

Halliwell, David H., Hattiesburg, Miss.; Atlanta Dental College, 1914; died August 28; age 69.

Harley, Leland W., Detroit; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1932; died September 23; age 53.

Harper, Oscar M., Findlay, Ohio; died September 5; age 85.

Harsen, Clark H., Algonac, Mich.; Detroit College of Medicine, Department of Dental Surgery, 1908; died September 21; age 80.

Harwood, Harrison B., Claremont, Calif.; University of Southern California School of Dentistry, 1907; died September 20; age 81.

Healy, Patrick S., Altoona, Pa.; University of Pittsburgh School of Dentistry, 1923; died September 25; age 61.

Hindes, Harry G., Forest Hills, N. Y.; New York College of Dentistry, 1916; died July 23; age 65.

Hobbs, John M., Fort Madison, Iowa; Keokuk Dental College, 1899; died June 17; age 89.

Hobby, George W., Stamford, Conn.; University of Pennsylvania School of Dentistry, 1902; died August 14; age 81.

Hogan, John A., Brooklyn; Temple University School of Dentistry, 1937; died August 27; age 47.

Honick, Henry, Baltimore; University of Maryland, Dental Department, 1915; died June 26; age 70.

Hood, Harold G., Waterford, Pa.; Western Reserve University School of Dentistry, 1918; died August 4; age 64.

Hoop, Thomas J., Donora, Pa.; University of Pittsburgh School of Dentistry, 1922; died July 24; age 61.

Horan, Albert R., Philadelphia; Temple University School of Dentistry, 1914; died May 2; age 69.

Houg, Birger J., Brooklyn; Baltimore College of Dental Surgery, University of Maryland, 1918; died September 1; age 78.

Houston, Richard C., Chicago; Omaha Dental College, 1902; died August 14; age 84.

Huff, John A., Chicago; Northwestern University Dental School, 1899; died July 5; age 88.

Hunter, Raymond W., Shelburne, Mass.; University of Pennsylvania School of Dentistry, 1894; died October 4; age 89.

James, Frank B., Bettendorf, Iowa; University of Iowa College of Dentistry, 1897; died September 7; age 87.

James, William S., Ann Arbor, Mich.; University of Michigan School of Dentistry, 1916; died October 10; age 85.

Jankovsky, Francis C., Long Beach, Calif.; University of Southern California School of Dentistry, 1926; died September 26; age 56.

Jennette, Alexander T., Washington, N. C.; Baltimore College of Dental Surgeons, University of Maryland, 1927; died October 9; age 54.

Johnson, Oscar T., Chicago; Northwestern University Dental School, 1900; died September 25; age 84.

Johnston, John M., Palm Springs, Calif.; Marquette University School of Dentistry, 1919; died October 14; age 64.

Jones, Austin L., Oklahoma City; died August; age 60.

directory

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MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N.J.
One-Hundred and Fifth Annual Session	November 9-12, 1964	San Francisco
One-Hundred and Sixth Annual Session	1965	Las Vegas, Nevada

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 24-26	Mobile	C. R. Crook, Professional Center, Montgomery
Alaska	July 10-12	Anchorage	W. E. Alexander, 406 G St., Anchorage
Arizona	Apr. 12-15	Phoenix	J. F. Vaughn, 2727 N. Central Ave., Phoenix
Arkansas	Apr. 9-12	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 16-19	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 2
S. California	Apr. 24-26	Los Angeles	J. H. Thomason, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 1-4	Colorado Springs	G. H. Siersma, 903 Republic Bldg., Denver 2
Connecticut	May 10, 11	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 9, 10	Wilmington	W. W. Flanagan, Jr., 309 S. State, Dover
Dist. of Columbia	Mar. 12-15	Washington	B. D. Mattox, 1835 Eye St., N.W., Washington 6
Florida	May 21-24	Miami Beach	E. M. Farber, 518 Tampa St., Tampa
Georgia	Oct. 1-4	Atlanta	F. M. Butler, Jr., 307 Southern United Bldg., Macon
Hawaii	June 18-22	Honolulu	J. H. Dawe, 291 Alexander Young Bldg., Honolulu 13
Idaho	Sept. 4-6	Sun Valley	L. L. Nissen, 401 Idaho St., Boise
Illinois	May 8-10	Peoria	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 14-17	Indianapolis	C. L. Howell, 1012 Hume Mansur Bldg., Indianapolis 4
Iowa	May 1-3	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines 9
Kansas	May 7-9	Kansas City, Mo.	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 9-12	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	May 5-7	Lafayette	J. S. Bernhard, 231 Atkins Ave., Shreveport 26
Maine	June 15-17	Rockland	S. M. Gower, 6 Coburn Ave., Skowhegan
Maryland	May 7-10	Baltimore	W. Schunick, 19 Medical Arts Bldg., Baltimore 1
Massachusetts	Apr. 30-May 3	Boston	H. E. Tingley, 227 Commonwealth Ave., Boston
Michigan	Apr. 10-12	Detroit	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 17-19	Minneapolis	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4W
Mississippi	June 25-28	Biloxi	M. C. O'Keefe, Medical Arts Bldg., Jackson 2
Missouri	May 7-10	Kansas City	E. D. Suggett, Merchants Bank Bldg., Jefferson City

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Nebraska	Apr. 24-26	Lincoln	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	Apr. 30-May 2	Las Vegas	O. M. Seifert, 821 Ryland Ave., Reno
New Hampshire	June 18-20	Whitefield	F. E. Williams, 517 Milton St., Manchester
New Jersey	May 14-17	Atlantic City	J. G. Carr, 407 Cooper St., Camden 2
New Mexico	May 10-13	Albuquerque	E. P. Purtell, 2917 Santa Cruz Ave., S.E., Albuquerque
New York	May 15-17	Syracuse	C. A. Wilkie, 268 Ashland Pl., Brooklyn 17
North Carolina	May 14-17	Pinehurst	S. B. Towler, P.O. Box 11065, Raleigh
North Dakota	Sept. 17-19	Fargo	D. R. Perry, Box 866, Bismarck
Ohio	Nov. 5-8	Columbus	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 23-26	Tulsa	W. C. Hopkins, 210 Plaza Court Bldg., Oklahoma City
Oregon	Mar. 6-8	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.			H. L. Mertz, Jr., P.O. Box 1417, Balboa
Pennsylvania	May 18, 19	Hershey	I. Sissman, 217 State St., Harrisburg
Puerto Rico			R. Gonzalez R., Box 10452, Caparra Heights
Rhode Island			E. M. Nelson, 901 Union Trust Bldg., Providence
South Carolina	May 7-10	Columbia	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 14-16	Aberdeen	R. E. Decker, 2909 Poplar Dr., Sioux Falls
Tennessee	May 14-18	Gatlinburg	K. P. Ezell, 210 23rd Ave., N., Nashville 5
Texas	Apr. 30-May 3	Houston	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	May 18-20	Salt Lake City	R. C. Dalgleish, 1554 Princeton Ave., Salt Lake City
Vermont	June 22-24	Vergennes	E. C. Woods, 128 Merchants Row, Rutland
Virginia	Apr. 30-May 3	Roanoke	M. E. Henderson, Shenandoah Bldg., Roanoke 11
Washington	Mar. 27-29	Seattle	R. V. Tucker, 417 Grosvenor House, 500 Wall St., Seattle 1
West Virginia	July 23-26	White Sulphur Springs	P. H. Loftin, 109 E. Main St., Beckley
Wisconsin	Apr. 24-26	Milwaukee	C. J. Baumann, Jr., 704 W. Wisconsin Ave., Milwaukee
Wyoming	June 15-17	Laramie	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 25-30* June 26†	Birmingham	W. L. Smith, 524 Chestnut St., Gadsden
Alaska			J. E. Miller, 1000 Fireweed Lane, Anchorage
Arizona	June 18	Florence	W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 18-23*†	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California	June 12-17 June 26-July 1	San Francisco Los Angeles	T. R. Flinn, 1021 O St., Rm. A-597, Sacramento 14
Colorado			B. DeRose, Republic Bldg., Denver 2
Connecticut	June 18-20* June 20, 21†	Bridgeport	M. J. Zazzaro, 99 Pratt St., Hartford 3
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia			J. A. Madden, 1740 Massachusetts Ave., N.W., Washington 11
Florida	July 2-12* July 2, 3†	Jacksonville	R. P. Taylor, Jr., P.O. Box 2913, Jacksonville 3
Georgia	May 29-31	Atlanta	H. M. Robertson, 206 Donehoo St., Statesboro
Hawaii	Feb. 9-12‡		F. S. Kagihara, 1644 S. King St., Honolulu
Idaho	June 19-22*†‡		W. M. Smith, 305 Fort St., Boise
Illinois			R. I. Humphrey, 185 N. Wabash Ave., Chicago
Indiana	June 6-9*†	Indianapolis	C. A. Frech, Gary National Bank Bldg., Gary
Iowa	June 5-8*†	Iowa City	P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas			R. C. Windscheffel, Medical Arts Bldg., Smith Center

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Maine			A. H. Garcelon, 133 State St., Augusta
Maryland	June 12-14	Baltimore	F. J. Bryce, 303 Granville Dr., Silver Spring
Massachusetts			M. E. Sullivan, 33 State House, Boston
Michigan	June 11-17	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4W
Mississippi			C. V. Pettey, Jr., Box 387, Magnolia
Missouri	June 5-7* June 5† June 12, 13*† June 8-10* June 8† June 12, 13*†	Kansas City Kansas City Kansas City St. Louis St. Louis St. Louis	R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			E. A. Cogley, Medical Arts Bldg., Great Falls
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada			R. Whitehead, 40 W. First St., Reno
New Hampshire			L. U. Bergeron, 211 High St., Somersworth
New Jersey	June 1, 2*† June 8, 9*† June 12 13*† June 19, 20 June 22, 23*†	Philadelphia New York Teaneck Trenton Philadelphia	C. J. Schweikhardt, 150 E. State St., Trenton 8
New Mexico	June 19-24*†‡		G. D. Hastain, Box 1007, Clovis
New York			D. F. Wallace, 23 S. Pearl St., Albany 7
North Carolina	June 26-30*†	Chapel Hill	J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota			F. A. Maides, First National Bank Bldg., Grand Forks
Ohio	June 12-14* June 14† June 15, 16*†‡ June 19-21* June 22-24*	Columbus Columbus Columbus Cleveland	D. E. Bowers, 322 E. State St., Columbus 15
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Oregon			C. Wheeler, Medical Arts Bldg., Portland
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Virginia	June 12-27* June 14, 15†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
Washington			W. B. Lamey, Medical Dental Bldg., Everett
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American Board of Oral Pathology	Apr. 6	Ann Arbor, Mich.	D. A. Kerr, School of Dentistry, University of Michigan, Ann Arbor, Mich.
American Board of Oral Surgery	Mar. 17-21 Dec. 4	Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 10-15	Denver	A. W. Moore, University of Washington, School of Dentistry, Seattle 5
American Board of Pedodontics			R. L. Ireland, College of Dentistry, University of Nebraska, Lincoln 8, Neb.
American Board of Periodontology	Apr. 10-12	Indianapolis	B. O. A. Thomas, 668 Homer Ave., Palo Alto, Calif.
American Board of Prosthodontics	Aug. 14-19	Chicago	C. H. Jamieson, David Whitney Bldg., Detroit 26
Council on Dental Education, Dental Aptitude Tests	Apr. 21, 22		S. Peterson, 222 E. Superior St., Chicago 11
National Board of Dental Examiners	Mar. 27, 28 Dec. 4, 5		Grace Parkin, 222 East Superior St., Chicago 11

MEETINGS OF OTHER ORGANIZATIONS

Name	*Date*	*Place*	*Secretary or Chairman and Address*
Academy of Denistry for the Handicapped	Feb. 5	Chicago	R. L. Holle, 3501 Cornell Pl., Cincinnati 20
Academy of Denture Prosthetics	May 7-12	Minneapolis	W. L. Warburton, Medical Arts Bldg., Salt Lake City 11
Academy of General Dentistry	Feb. 7	Chicago	A. L. Knab, 8500 Stony Island Ave., Chicago
Academy of Oral Dynamics	Mar. 11, 12	Washington, D.C.	J. T. McSweeney 140 E. 80th St., New York 21
American Academy of Crown and Bridge Prosthodontics	Feb. 4, 5	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Medicine Cruise Convention	May 26-June 2	Bermuda-Nassau	G. Clarke, 554 Franklin St., Melrose, Mass.
American Academy of Dental Practice Administration	Feb. 2-4	Chicago	R. H. Campbell, 18595 Grand River Ave., Detroit 23
American Academy of Oral Pathology	Apr. 6-8	Ann Arbor, Mich.	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis
American Academy of Periodontology	Apr. 24-26	Ann Arbor, Mich.	C. E. Chamberlain, 1101 N. North St., Peoria, Ill.
American Academy of Physiologic Dentistry	June 12-14	Duluth, Minn.	E. A. Lawton, 2217 Lincoln Way West, South Bend, Ind.
American Academy of Restorative Dentistry	Feb. 4, 5	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association of Dental Schools	Mar. 26-29	Boston	R. Sullens, 840 N. Lake Shore Dr., Chicago 11
American Association of Endodontists	Feb. 2-5	Chicago	E. C. Van Valey, 9 Rockefeller Plaza, New York 20
American Association of Industrial Dentists	Apr. 10-12	Los Angeles	E. R. Aston, Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg
American Association of Orthodontists	Apr. 16-21	Denver	E. E. Shepard, 225 S. Meramec Ave., St. Louis 5
American Dental Society of Europe	June 24-30	Paris, France	J. P. Molony, 110 Harley St., London W.1, England
American Denture Society	Feb. 2-4	Chicago	V. L. Steffel, 19 W. Fifth Ave., Columbus, Ohio
American Equilibration Society	Feb. 2	Chicago	R. C. Van Dam, 11431 S. Halsted St., Chicago 28
American Hypnodontic Society	June 18	New York	R. M. Ferber, 140 E. 56th St., New York

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Name	*Date*	*Place*	*Secretary or Chairman and Address*
American Society for the Advancement of General Anesthesia in Dentistry	Mar. 27	New York	M. H. Feldman, 730 Fifth Ave., New York 19
American Society of Geriatric Dentistry	Feb. 4	Chicago	P. G. Rubens, 55 E. Washington St., Chicago 2
American Society of Psychosomatic Dentistry and Medicine	Mar. 10-12	Washington, D.C.	J. Caden, 5213 Connecticut Ave., N.W., Washington, D.C.
Australian Dental Congress (Sixteenth)	Aug. 14-18	Sydney, N.S.W.	D. Freeman, 185 Elizabeth St., Sydney, New South Wales
Berkshire Conference in Oral Pathology and Periodontology (Twelfth)	June 18-22	Lenox, Mass.	I. Glickman, Tufts University School of Dental Medicine, 136 Harrison Ave., Boston 11
British Dental Association	June 18-23	Harrogate, U.K.	J. Peacock, 13 Hill St., Berkeley Sq., London W.1, England
Canadian Dental Association and Western Canada Dental Society	June 4-7	Saskatoon	N. F. Gropper, Canada Bldg., Saskatoon, Sask., Canada
Central Dental Association	Feb. 19-22	Aspen, Colo.	D. I. Muirhead, Hastings, Minn.
Chicago Dental Society	Feb. 5-8	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
European Organization for Research on Fluorine and Dental Caries Prevention (ORCA)	July 5-8	London, England	H. R. Held, 18 Passage du Teraillet, Geneva, Switzerland
Fauchard Bicentenary	July 1, 2	Paris, France	M. Filderman, 67 rue de Tocqueville, Paris, France
Fédération Dentaire Internationale, 49th Annual Session	July 9-15	Helsinki, Finland	G. H. Leatherman, 35 Devonshire Pl., London W.1, England
Greater Philadelphia Annual Meeting	Mar. 21-24	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. & Pennsylvania Blvd., Philadelphia 3
International Association for Dental Research	Mar. 23-26	Boston	D. Y. Burrill, 311 E. Chicago Ave., Chicago 11
International Association of Dental Students	Aug. 21-27	London, England	D. H. Clark, Royal Dental Hospital, Leicester Sq., London W.C.2, England
Italian Dental and Maxillo-Facial Congress (Fourth)	June 3-11	Turin	Secretary, A.N.I.D.I., Via XX Settembre 8, Genoa, Italy
Mid-West Society of Periodontology	Feb. 5	Chicago	L. Howlett, Jr., Medical Arts Bldg., Springfield, Mo.
National Dental Association	Aug. 6-10	Washington, D.C.	E. N. Jackson, P.O. Box 197, Charlottesville, Va.
Northeastern Dental Society	June 4-7	Swampscott, Mass.	N. A. Emery, 291 Broadway, Lynn, Mass.
Northeastern Society of Orthodontists	Mar. 6, 7	New York	D. Mossberg, 36 Central Park S., New York 19
Northeastern Society of Periodontists	Apr. 7	New York	I. W. Scopp, V.A. Hospital, First Ave. at E. 24th St., New York 10
Northwest Academy of Dental Medicine (Seventeenth Annual Conference)	May 25-28	Gearhart, Ore.	G. Underwood, Selling Bldg., Portland 5, Ore.
Philippine Dental Association	May 10-14	Baguio City	L. C. Macapanpan, Philippine Dental Association, P.O. Box 1142, Manila
Southeastern Academy of Prosthodontics	May 18-21	Bal Harbor, Miami Beach, Fla.	J. H. Allgood, 516 Military Rd., Columbus, Miss.
Southern Academy of Oral Surgery	Mar. 25, 26	Atlanta, Ga.	H. E. Loving, Central Building, Mahoney Wing, Bristol, Tenn.
Southeastern Society of Oral Surgeons	Apr. 27-29	Miami Beach, Fla.	E. H. Martin, 1900 Hayes St., Nashville 4, Tenn.
Spanish Society of Orthodontics (Seventh)	Apr. 27-30	Valencia	A. J. Cervera, Avda. Oeste, 29, Valencia, Spain
Swiss Dental Society, Seventy-fifth Anniversary	June 1-4	Basle	B. Jakubowitsch, Blumenrain 20, Basle, Switzerland
Thomas P. Hinman Dental Meeting	Mar. 26-29	Atlanta, Ga.	A. E. Anderson, 1387 Oxford Rd., N.E., Atlanta 7

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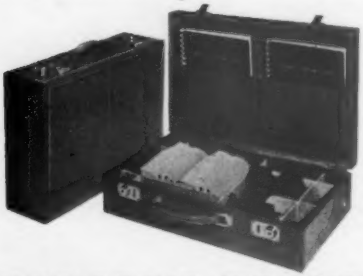

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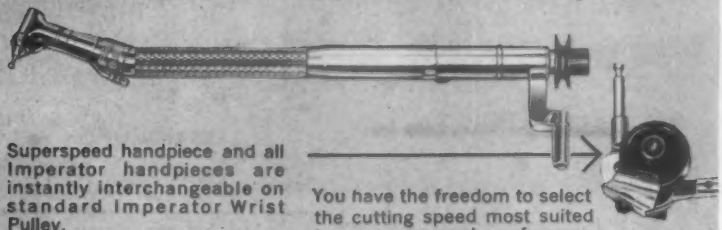

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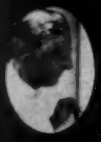

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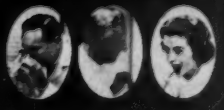

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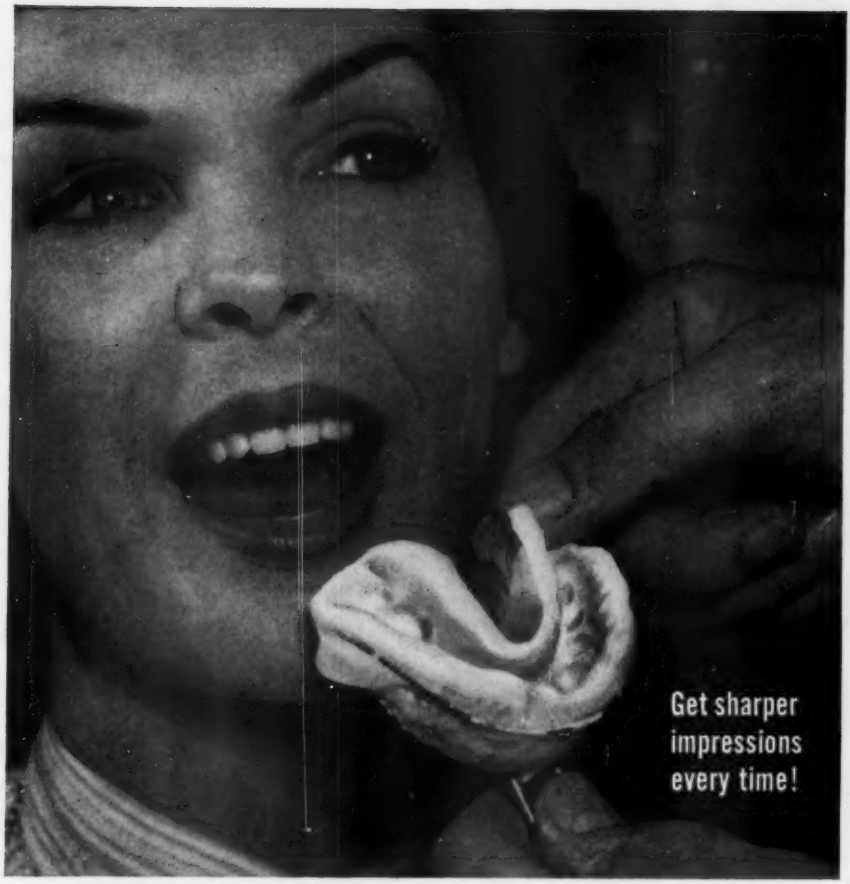

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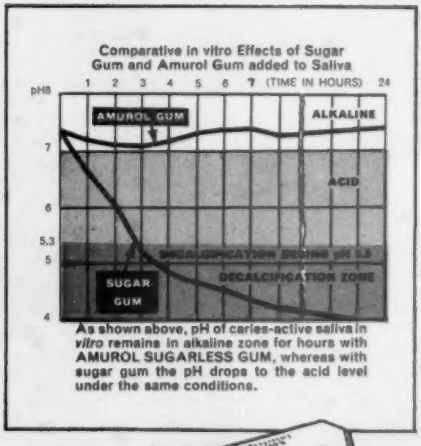

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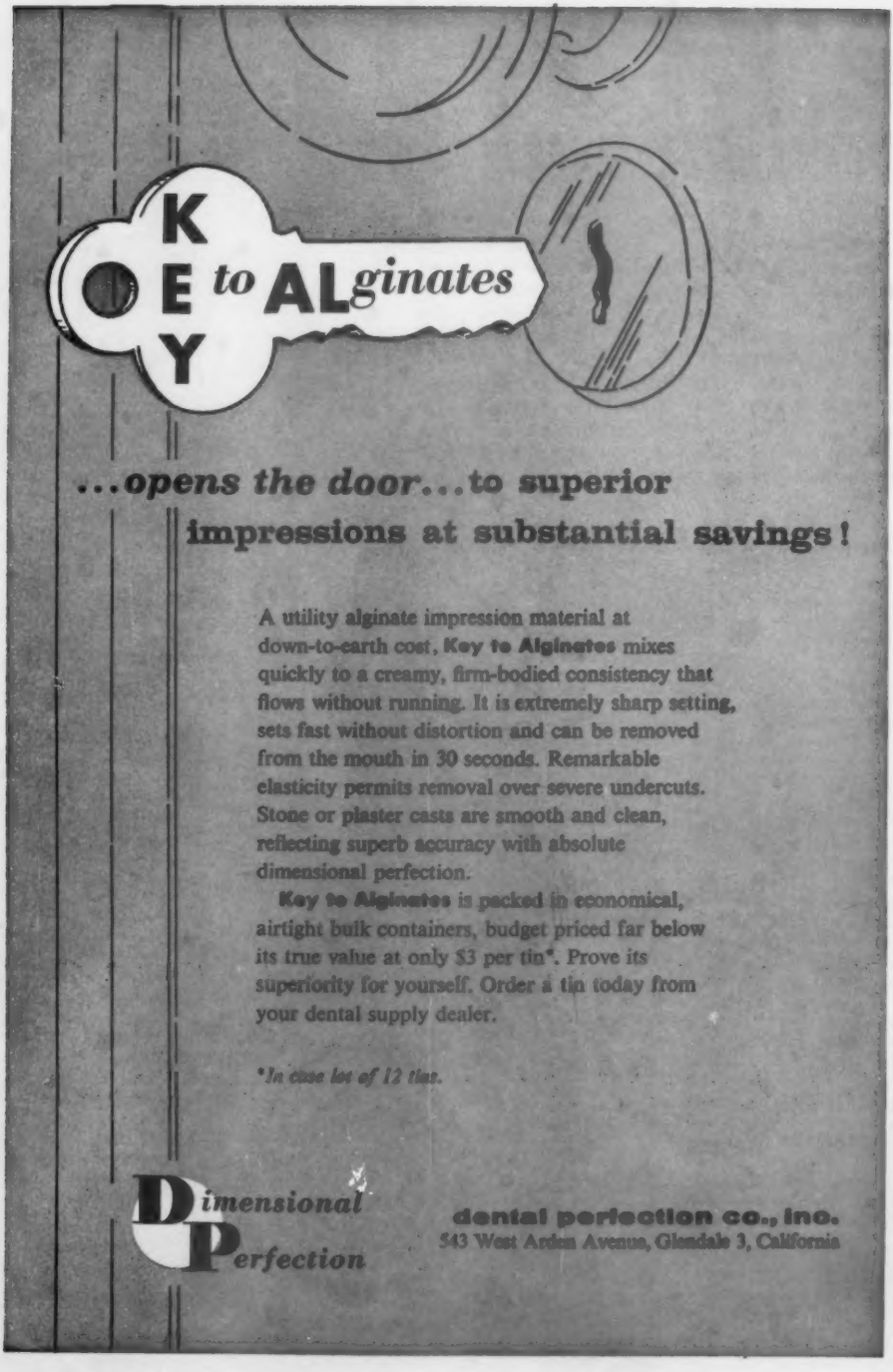

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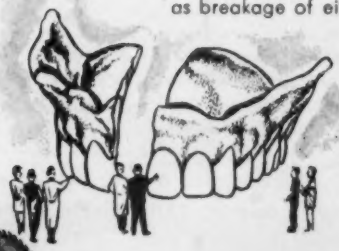

* Department of dentistry and oral surgery, Henry Ford Hospital.

** November, 1960, Journal of the American Dental Association.

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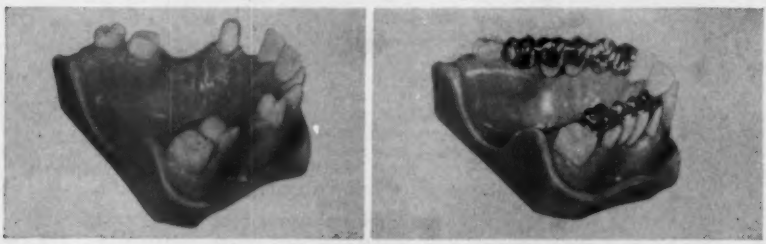

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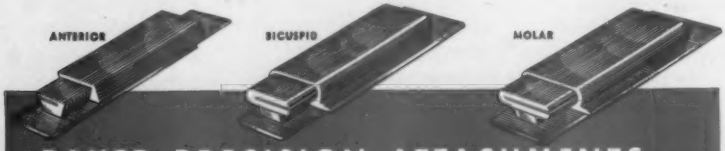

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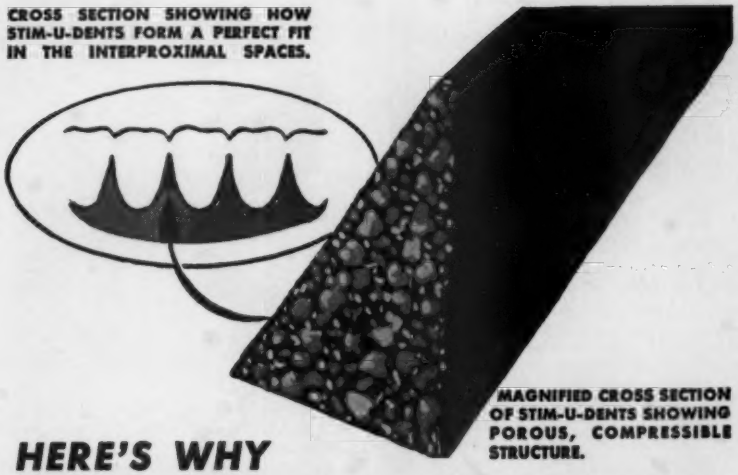

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BECAUSE, WHEN MOISTENED, STIM-U-DENTS, BY REASON OF THEIR COMPRESSIBILITY, form a perfect fit in the teeth spaces not reached by the toothbrush.

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JADA 2-61

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What's she doing that's of interest to her dentist?

She's drinking a glass of pure Florida orange juice. And that's important to her dentist for several reasons.

Your patient's oral health is directly related to the quality of her diet, and a good diet includes a generous amount of vitamin C and any of the other nutrients found in citrus fruits.

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We know that a tall glass of orange juice is just about the best thing they can reach for when they raid the refrigerator. We also know that if you encourage this refreshing and healthful habit among your young patients, you'll be helping them to the finest between meals drink there is.

Nothing has ever matched the quality of Florida citrus—watched over by a State Commission that enforces the world's highest standards for quality in fresh, frozen, cartoned or canned citrus fruits and juices.

That's why the young lady's activities are of interest to her dentist.

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I find about half my patients need Dental Floss. So I recommend it—for both periodontal cases and routine use.

But teaching patients how to use it properly takes time. Lost minutes mount into money. I give them one of these easy-to-follow folders, "How to Use Dental Floss." Approved by the ADA.

Just fill in the coupon for a generous supply—and save valuable time.

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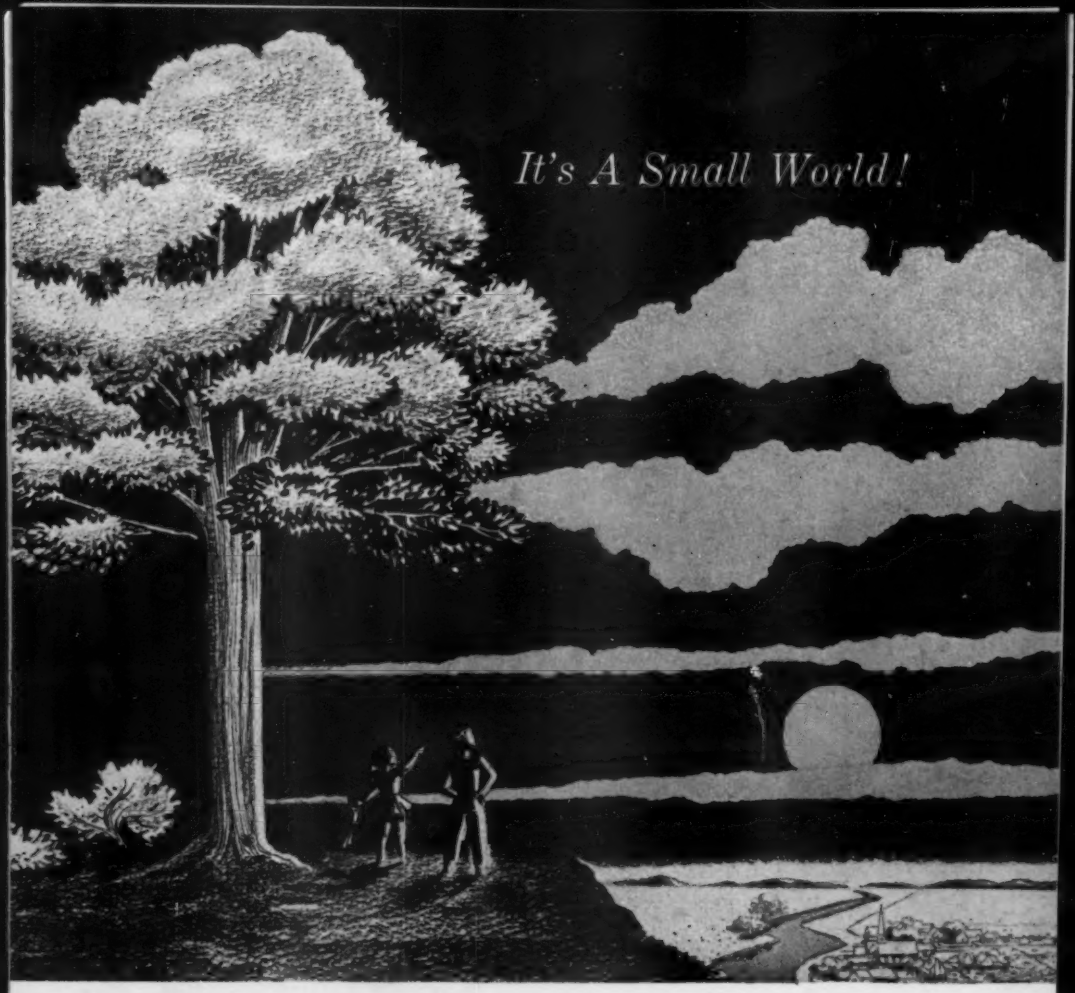

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RINN PEDODONTAL FILM . . . The new generation is coming up—the Tom Sawyers, the Becky Thatchers. Their inventiveness and scientific knowledge hold the solution for all problems. And yet, a child's dreams are scarcely more incredible than the true stories which are being written today. Rinn research, for example, in the field of Roentgenography, has inspired the development of Pedodontal film called "Tinytot"—smaller than any child-size X-Ray film available. Obtainable in all speeds, with matte finish, it provides more accurate placement, eliminates distortion because of bending and allows complete patient comfort. It's ideal for the "small world" of Tom or Becky. For further information see your dealer or write Rinn Corporation, 2929 North Crawford Avenue, Chicago 41, Illinois. Catalog of the complete Rinn line is available upon request.

Rinn

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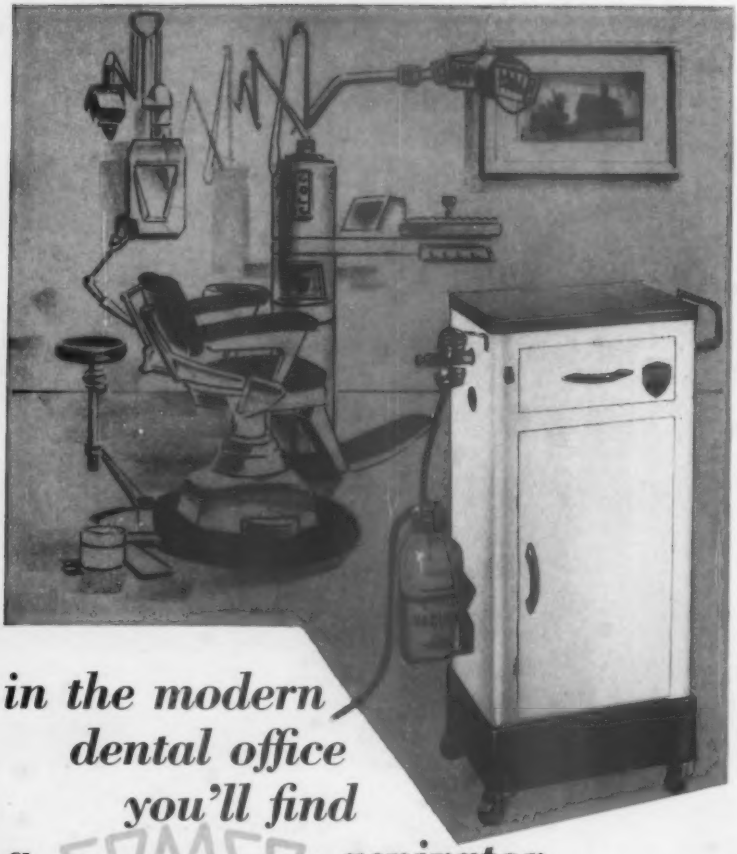

in the modern dental office you'll find a GOMCO *aspirator*

A Gomco No. 796 Cabinet Aspirator will speed up your operations . . . make them easier on you and the patient. Its powerful suction assures a *clean* operating field, resulting in greatly improved visibility. Remember, faster operations conserve chair time . . . can enlarge your practice. And don't forget the prestige this modern, clean-lined unit will add to your office. Compact, it requires less than a square foot of floor space. Thousands of successful dentists rely on the No. 796 for the utmost efficiency and dependability.

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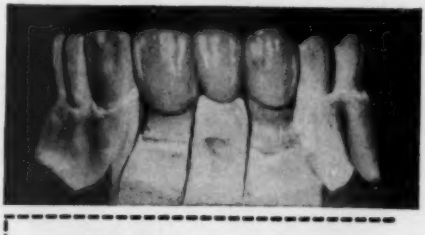
Practically all bathtubs are made of porcelain; since porcelain is so brittle and friable, why don't bathtubs ever break?

Bathtubs are not really made of porcelain. Actually, they are cast iron with a thin layer of porcelain baked to the metal; and this provides the strength that makes bathtubs practically unbreakable.

The principle of Ceramco bridgework is the same; a thin layer of Ceramco porcelain is fused or baked to a solid framework of gold to impart to the bridge all the strength and fit inherent in the Ceramco gold alloy.

Ceramco bridges are *not* porcelain bridges . . . they are *gold* bridges with a thin covering of Ceramco porcelain for maximum esthetics to provide the strongest, most natural restorations available.



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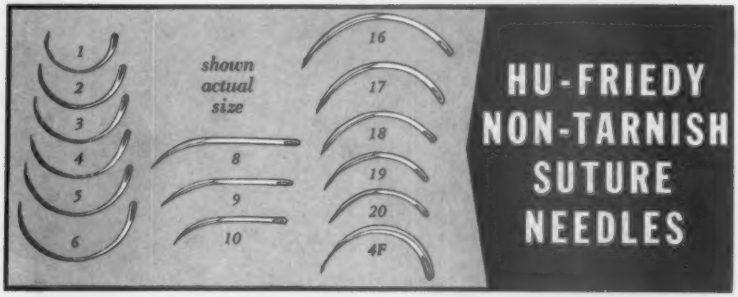

These rust-resisting needles remain bright after continuous sterilization. Made of the same flawless grade of steel which has made Hu-Friedy products the favorite of Oral Surgeons the world over. Hu-Friedy Needles have attained high praise for durability, strength, and sharpness of the cutting edges. At better dealers everywhere.

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Buffalo Dental Stainless Steel Spatulas have the desired combination of strength and flexibility. They are available in a wide variety of blade sizes.

"R" Group Blades are of finest quality stainless steel and are fastened securely with 2 heavy brass rivets into polished rosewood handles.

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COE-Flex the outstanding all-purpose rubber impression material, *is popular with everybody.* With dentists because it possesses an accuracy and dimensional stability unequalled today. It is easy to use (mixes easily, speeds up impression taking, conserves chair-time); safe to use (pouring can be delayed). With patients because it makes impression taking more pleasant. With technicians because it assures better fitting cases, avoids make-overs . . .

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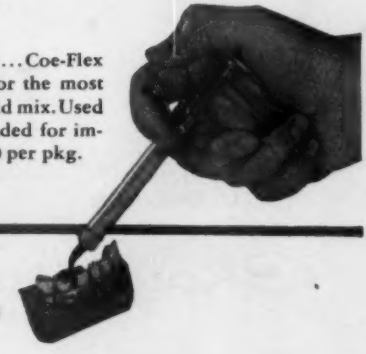

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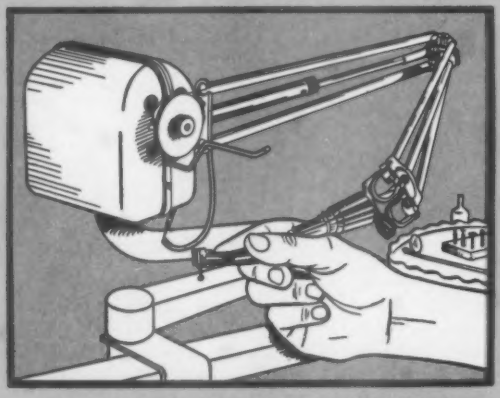

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Steplessly variable from 1500 to 180,000 RPM

TORQUE?
Adequate for the most delicate excavation, extension and gross reduction

NOISE?
The least of any ultra-speed system

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Professional confidence in the uniformity, potency and purity of Bayer Aspirin is evidenced by ever increasing recommendation. Today Bayer Aspirin is the most widely accepted brand of analgesic in the world.

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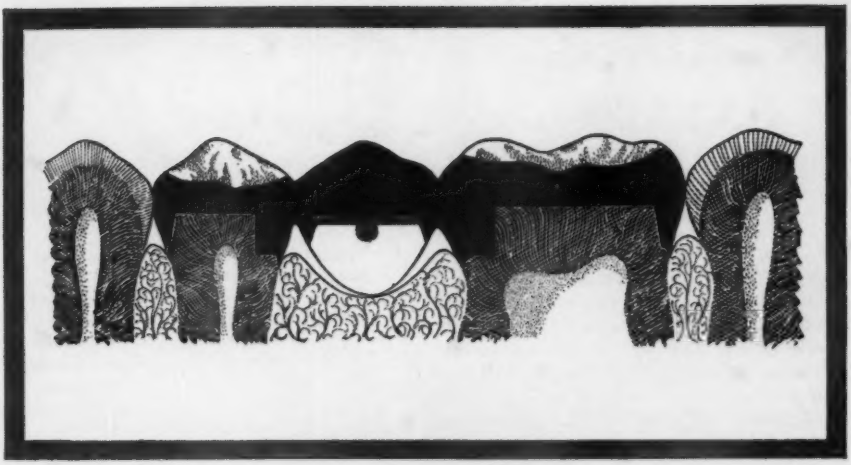

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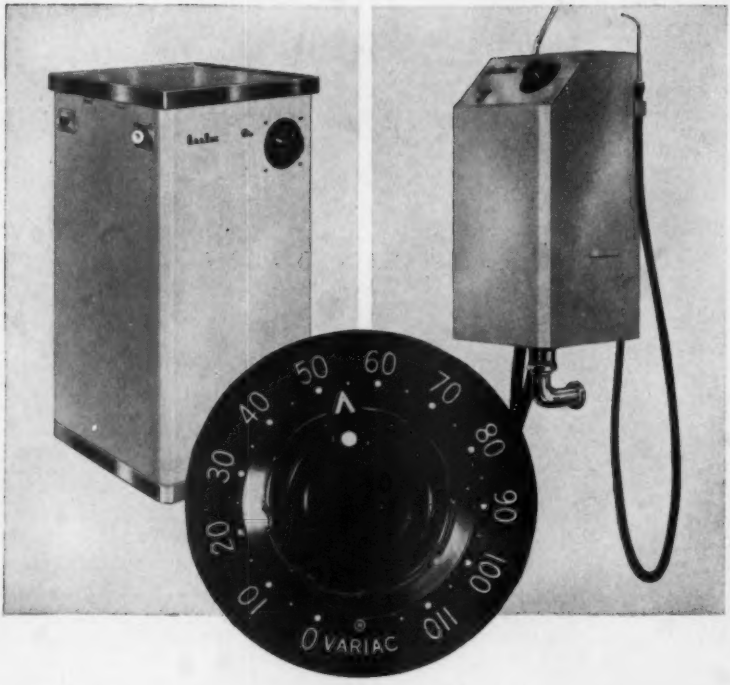

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EXCLUSIVE WITH TORIT ORA-VAC: variable power control . . . and more power than any other oral evacuator. With a turn of the exclusive Variac dial, you set evacuation to match your work speed and the water needs of the specific operational procedure. No other evacuator gives you this adaptability, this versatility! Ora-Vac is available in a mobile floor unit with a concealed 6-quart refuse container . . . and in an easily installed wall model that can be connected by hose to the cuspidor or direct to plumbing. Get oral evacuation you can control: get Torit's Ora-Vac.

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TORIT MANUFACTURING CO.

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BUT DOCTOR, IS CALCIUM REALLY THAT IMPORTANT?

YES . . . and the importance of calcium is best observed in people who have always enjoyed sufficient amounts of milk. Shape . . . stature . . . locomotion . . . all are dependent upon the support given the body by the skeleton and its main constituent: calcium. Over 99% of this element in the body resides in the bones and teeth where it lends rigidity to these tissues and is stored for future needs. The remaining 1% serves several vital functions . . . in the clotting of blood, the activation of enzymes, and the transmission of nerve impulses to the heart and other organs.

In some areas of the world, low calcium, phosphorus and vitamin D intakes combine to cause growth retardation and bone deformities. Calcium intake must be adequate, along with adequate phosphorus and vitamin D, to treat infantile rickets and adult osteomalacia. Milk and milk products . . . particularly those fortified with vitamin D . . . more than any other food group . . . have been responsible for the infrequent occurrence of these diseases in the United States.

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Normal calcium metabolism is dependent upon several other factors, including phosphorus for bone salt formation . . . vitamin D and lactose for efficient calcium absorption . . . and protein for the synthesis of bone matrix. Thus calcium in the diet should be accompanied by all those nutrients necessary for its proper utilization. When milk is the source of calcium, these and other *PLUS* factors will also be provided.

Milk and other dairy foods stand alone in their ability to provide calcium needed for all body processes in a form that is highly palatable, easily digested, and readily absorbed . . . and they also provide other nutrients that contribute to a balanced dietary and buoyant health.

The nutritional statements made in this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

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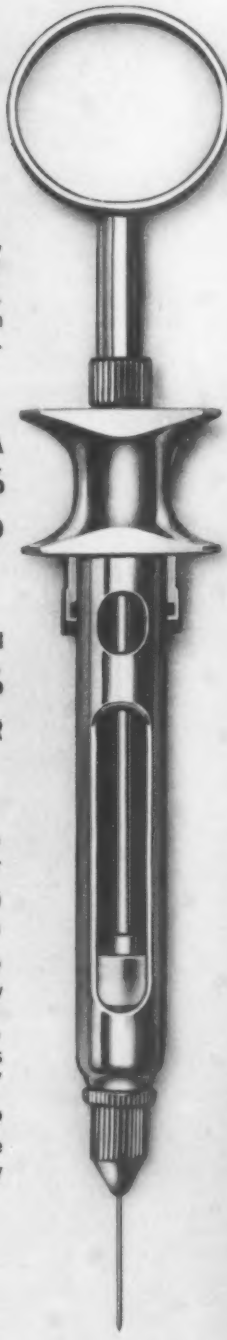

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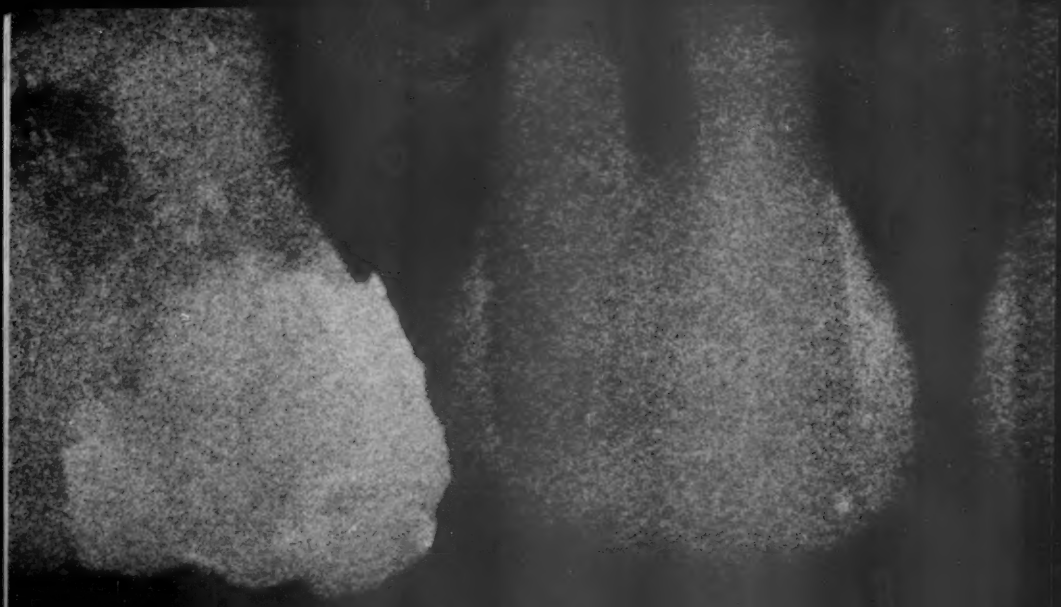

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References: 1. Luduena, F. P., Hoppe, J. O., Coulston, F., and Drobeck, H. P. The pharmacology and toxicology of mepivacaine, a new local anesthetic. Toxicology & Applied Pharmacology 2:295 May 1960. 2. Luduena, F. P., Hoppe, J. O., Oyen, I. H., and Wessinger, G. D. Some pharmacologic properties of levo- and dextro-nordefrin. J. D. Res. 37:206 April 1958. 3. Buchert, R. W. The influence of concentration of vasoconstrictor on local anesthesia. Oral Surgery, Oral Medicine and Oral Pathology 12:1340 November 1959. 4. Weil, C., Welham, F. S., Santangelo, C., and Yackel, R. F. Clinical evaluation of mepivacaine hydrochloride by a new method. (to be published) 5. Ross, N., and Dobbs, E. C. A preliminary study on Carbocaine. J.A.D.S.A. 7:4 November 1960. 6. Berling, C. Carbocaine in local anaesthesia in the oral cavity. Odont. Revy. 9:254 1958. 7. Dobbs, E. C., and Ross, N. The new local anesthetic, Carbocaine. (to be published) 8. Mumford, J. M., and Gray, T. C. Dental trial of Carbocaine. Brit. J. Anaesth. 29:210 May 1957. 9. Feldman, G., and Nordenram, A. The anaesthetic effect of Carbocaine and lidocaine. Svenska Tandl.-Tidskr. 52:531 1959. 10. Sadove, M., and Wessinger, G. D. Mepivacaine, a potent new local anesthetic. J. International College Surgeons 34:573 November 1960. 11. Sadove, M., Vernino, D., and Lock, F. Mepivacaine HCl (Carbocaine), a preliminary clinical study. J. Oral Surgery, Anes. & Hosp. D. Serv. in press 1961. 12. Wessman, T. A private practitioner's view of a local anaesthetic without a vasoconstrictor. Sverig. Tandläk.-Forb. Tidn. No. 3 1959. 13. Schwarzkopf, H. A further advance within the field of odontological local anesthesia. Deutsche Zahnarztebl. No. 24 1959.

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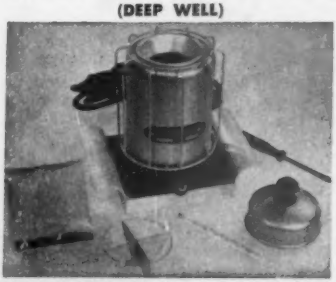

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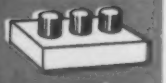

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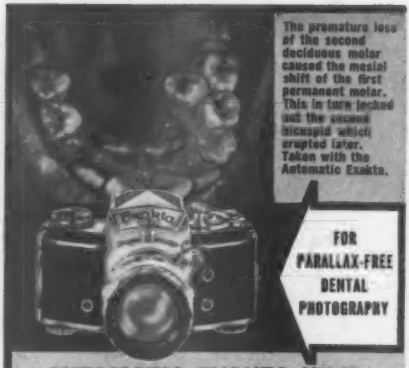

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1. Sleight, P.: The Lancet, p. 305, Feb. 6, 1960
2. Paul, W.D.: Dryer, R.L., and Routh, J.L.: J. Am. Pharm. Assn. (Scient. Ed.) 39:21 (Jan.) 1950.
3. Tebrock, H.E.: Ind. Med. & Surg. *20:* 480-482, 1951

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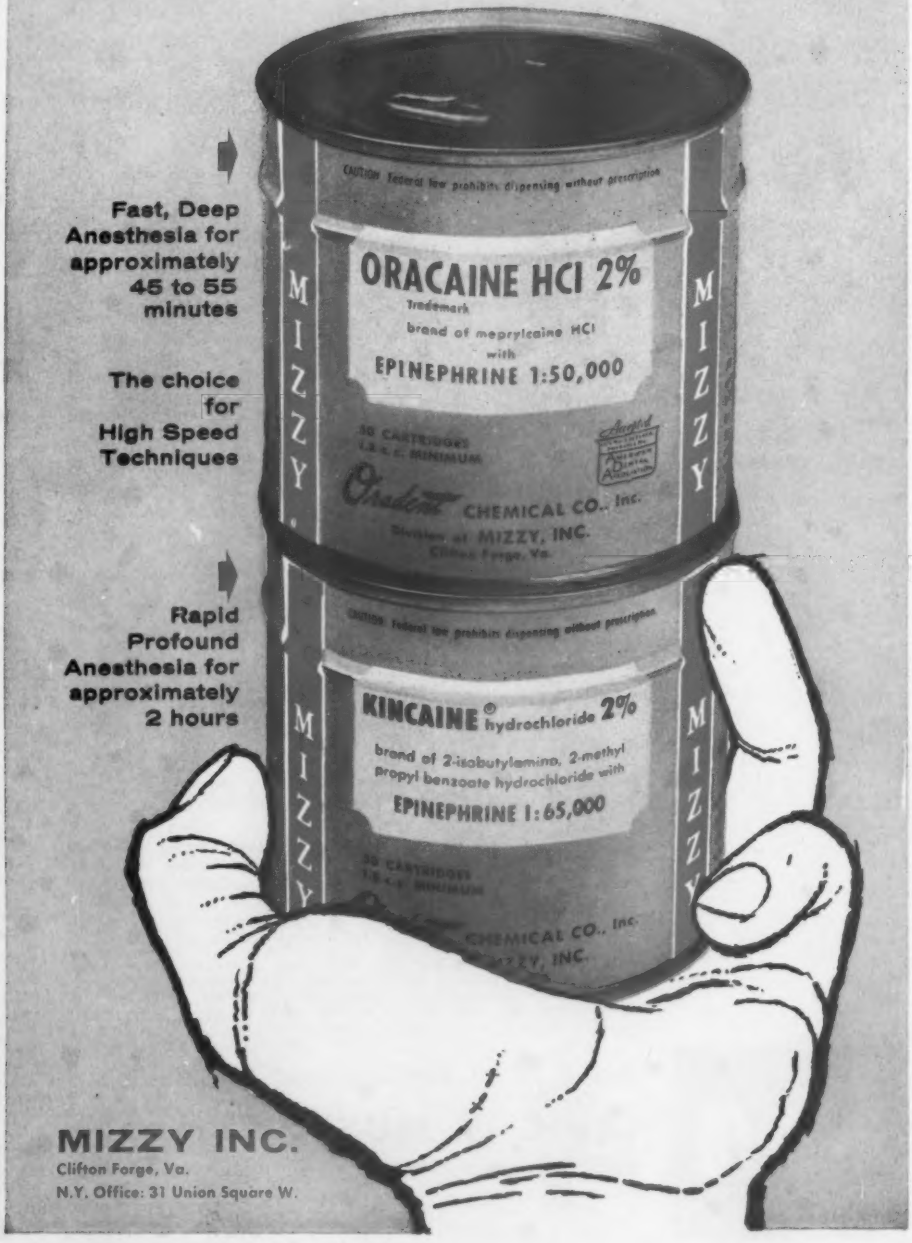

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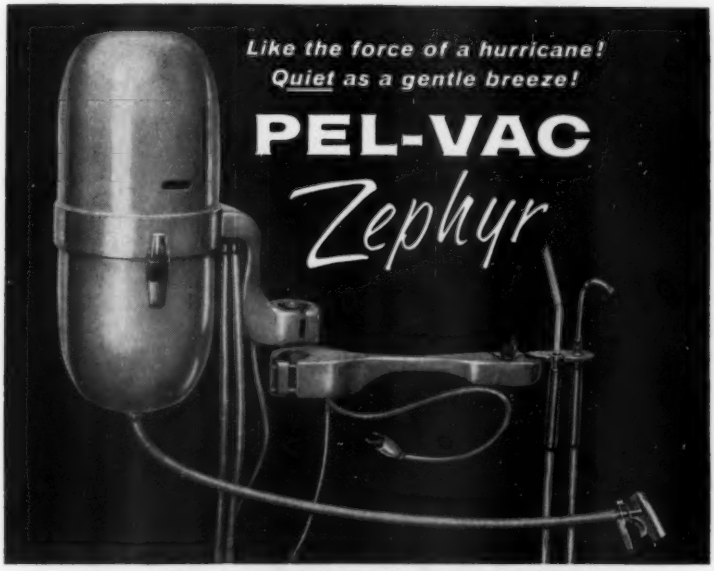

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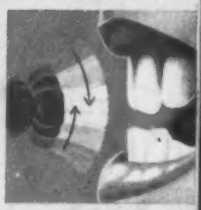

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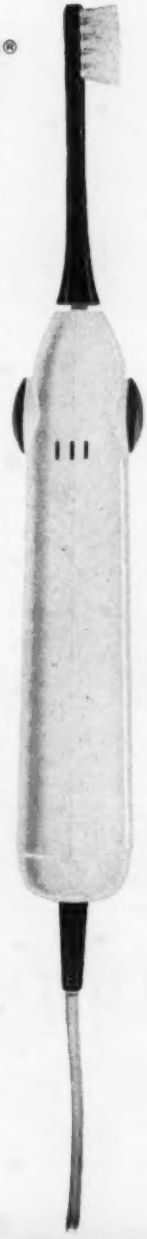

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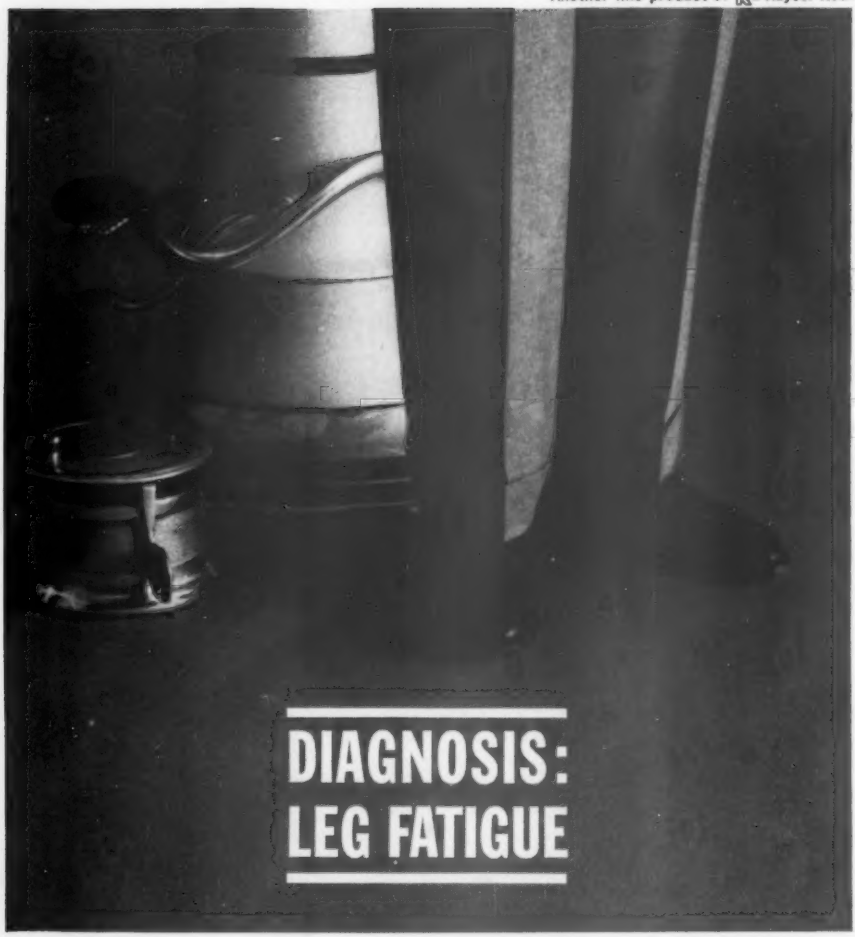

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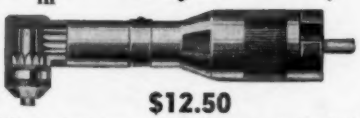

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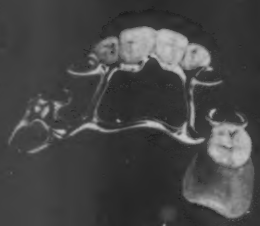

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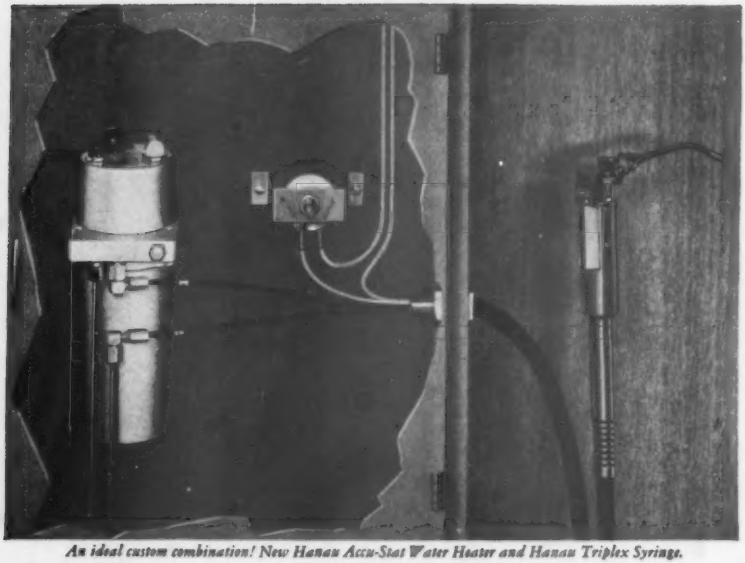

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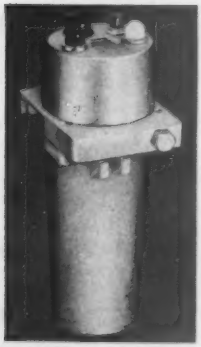

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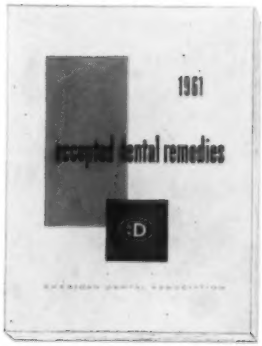

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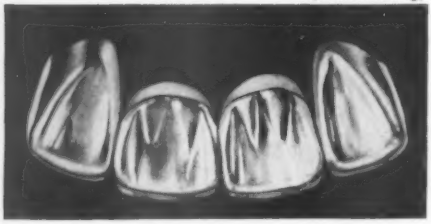

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